



# //Khara Hais Municipality



# Water Services Development Plan

(Interim Draft)

NOVEMBER 2006



**//KHARA HAIS MUNICIPALITY  
WATER SERVICES DEVELOPMENT PLAN  
NOVEMBER 2006**

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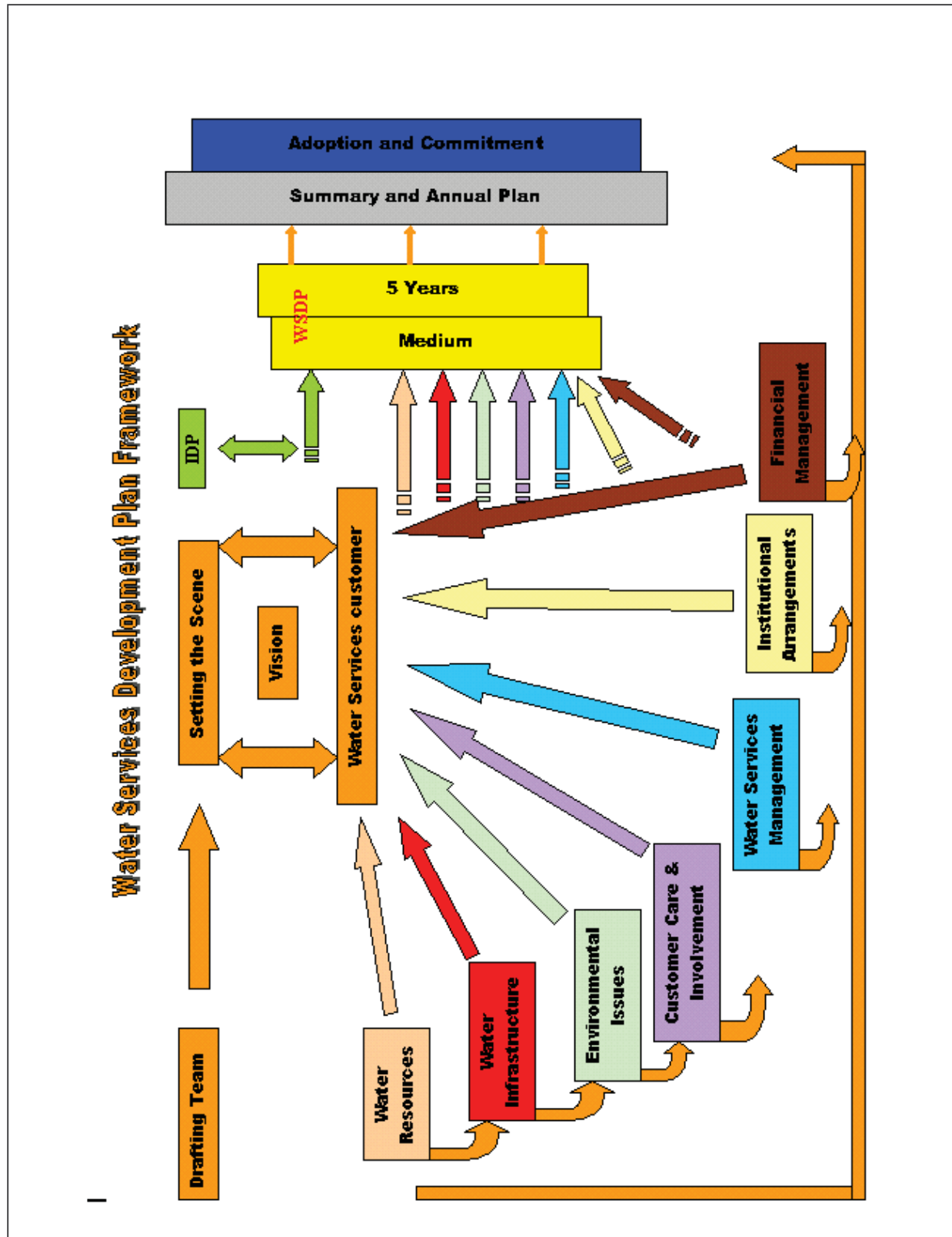
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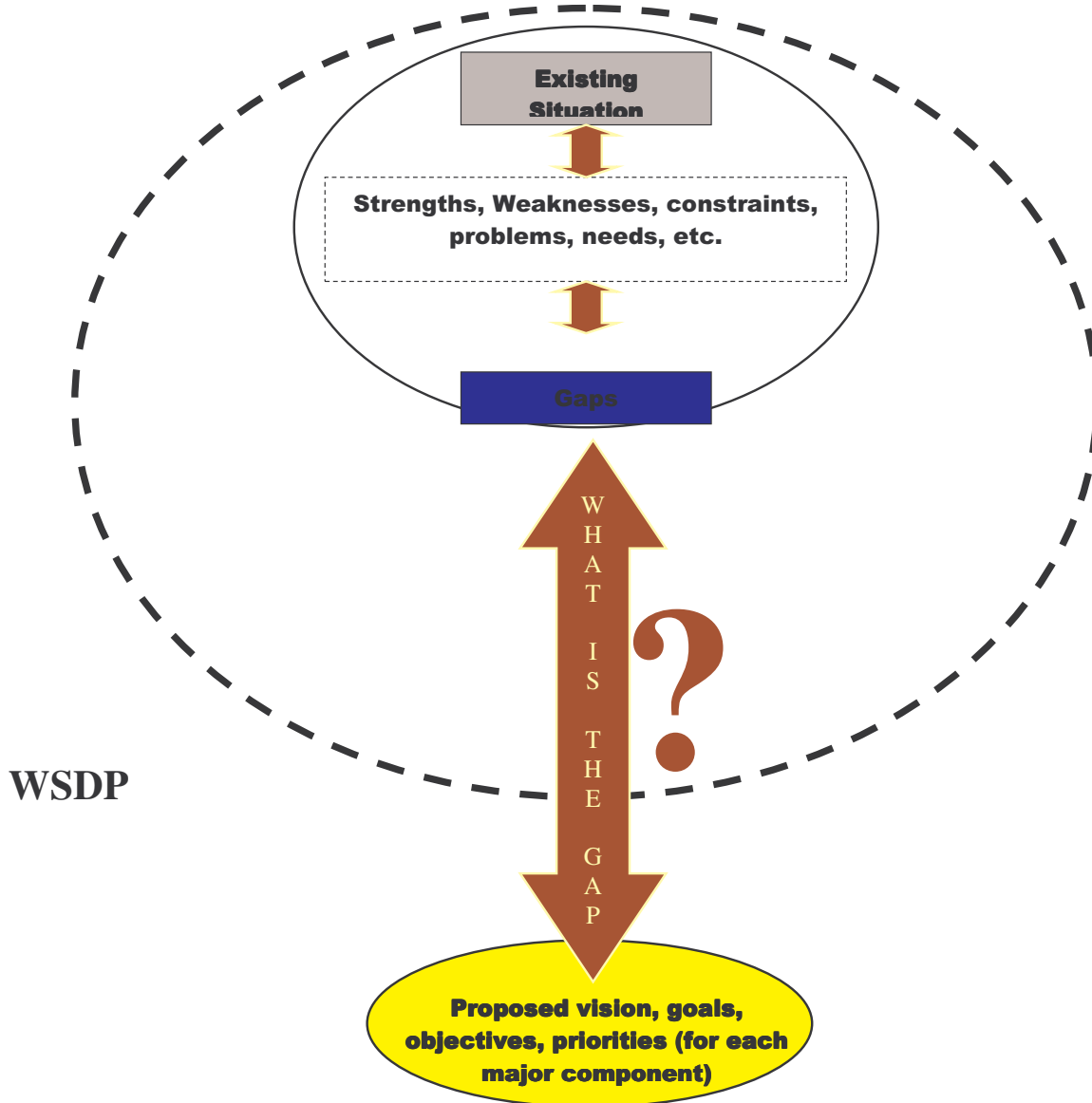
## Section A Introduction

### A 1. Roadmap of planning framework



## A 2. Strategic Analysis

Key issues to address in each strategic analysis



*What needs to be done to bridge the gap?*

*What are the different 'options' towards achieving the objectives/priorities?*

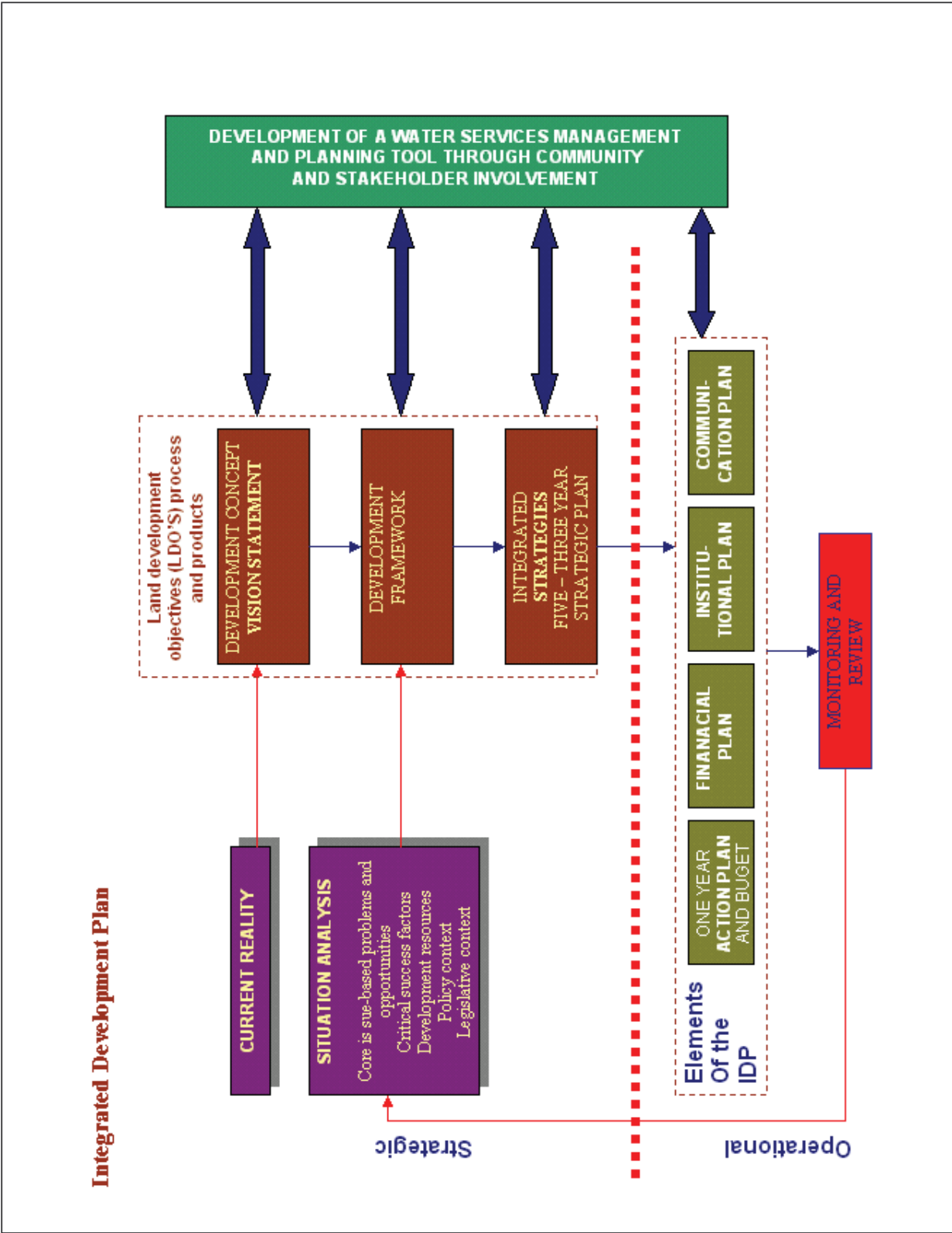
*What are the constraints in terms of options?*

*What is feasible within existing constraints?*

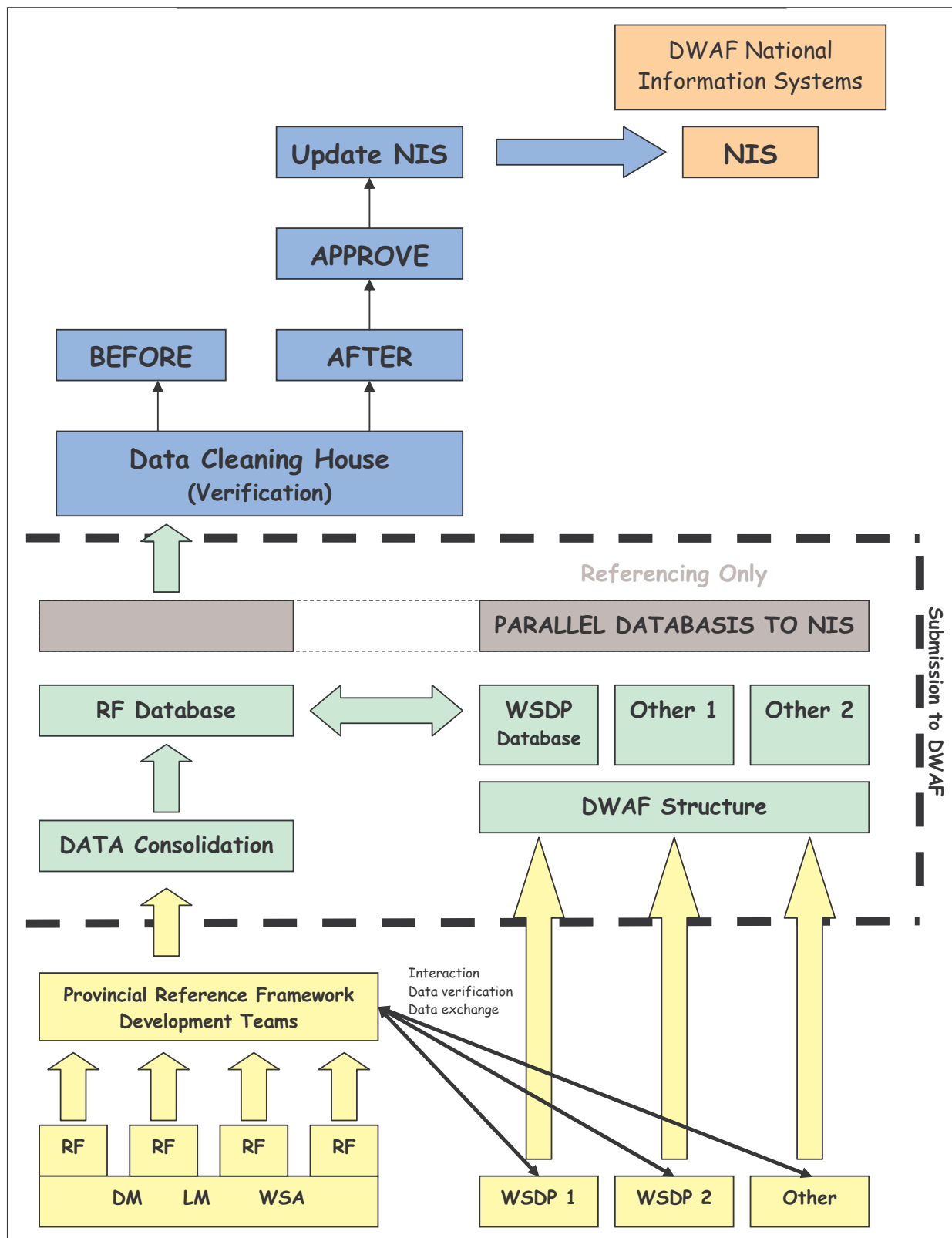
*What assumptions are being made?*

*What needs to be flagged?*

A 3. IDP Methodology



#### A 4. Program interaction and data exchange



## Section B Administration

### B.1 Name of WSA

//Khara Hais Municipality

### B.2 Status of WSDP

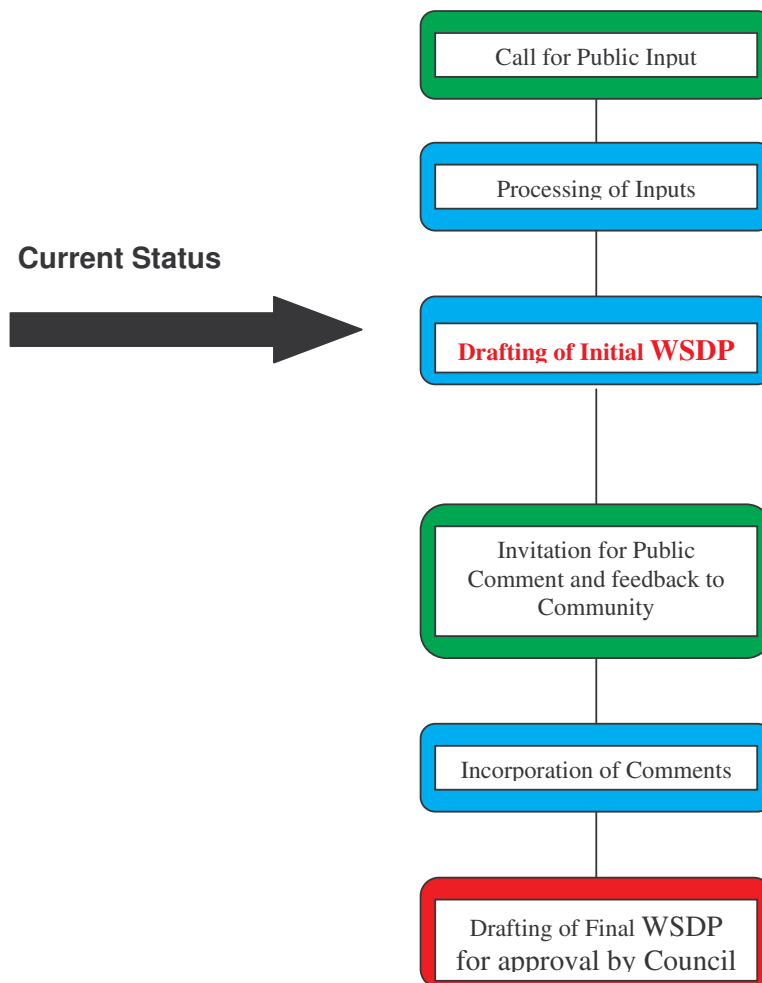
This is a **NEW** Water Service Development Plan as the //Khara Hais Municipality has not submitted a WSDP under its current name after demarcation in 2001.

### B.3 WSDP Drafting Team

| Name                                           | Designation                                                            | Role                                                                                                                                                 | Contact Details |
|------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| G van Staden<br>N November<br>J Isaacs         | Mayor<br>SALGA Representative<br>Portfolio Councillor: Water           | Review of Progress<br>Provides SALGA technical support<br>Leader : WSDP Steering Committee                                                           |                 |
| E Ntoba<br>J Mohutsiwa<br>C Geldenhuys         | Municipal Manager<br>Chief: Finances<br>IDP Manager                    | Review of Progress and reports to Mayor<br>Provides financial information<br>Leads IDP steering committee                                            |                 |
| E Abrahams<br>K De Monk<br>C Brink<br>S Berend | Technician: Water Care<br>Chief: Fire Brigade<br>Customer Care Officer | Provides water quality information<br>Provides Disaster Management info<br>Catchment Management representative<br>Provides Customer Care information |                 |
| K Streuders                                    | DWAF WSDP Coordinator                                                  | Provides DWAF technical support                                                                                                                      |                 |
| GH Meiring                                     | BVi Consulting Engineers                                               | Technical support                                                                                                                                    |                 |

#### B.4 Process Followed

As the Water Services Development Plan constitutes a chapter of the Integrated Development Plan, the same public participation process was utilized for both documents. The basic process can be described as follows:



During the original awareness campaign piloted by the Council at the commencement of the IDP process, many valuable lessons were learnt that enabled the Council to establish an appropriate method of communication thus ensuring sufficient participation.

The various methods that were used to provide input and feedback on the Water Services Development Plan for the //Khara Hais municipality to and by its community, are a combination of the following:

- Sending out of newsletters and information pamphlets in conjunction with the monthly municipal account.

- The ward committee system offers a good opportunity for the conveyance and receipt of information to and from the community.
- The local radio station, Radio Riverside, is used with great success by the Council to provide regular feedback to the community about Council matters. A specific time slot has been made available to the Council and in this way, through the programme “From the Council Chamber” persons with the necessary authority, like the Mayor, provide the community with feedback on a weekly basis.
- The existing notice boards at clinics, pay points and other Council buildings are used for announcements of information to the community.
- The present Council has made use of public meetings at central points within the community to provide feedback and to answer questions regarding Council matters. These occasions are also used by members of the community to provide the necessary feedback with regard to the WSDP.
- Comprehensive feedback and reporting from the various municipal departments to the Council and its committees takes place on a quarterly basis.

During the process to provide information to the communities and to receive information and feedback from them, use will be made of existing structures, organisations and institutions within the jurisdictional area of the municipality. The following structures, organisations and institutions have already been identified and the list will be updated as the process progresses.

- Organisations representative of specific interest groups:
  - ✚ Community development forums
  - ✚ Youth organisations
  - ✚ Tax payers associations/ Community organisations
  - ✚ Trade Unions
  - ✚ Women’s organisations
  - ✚ Service organisations
  - ✚ Consumer organisations
  - ✚ Association for the disabled
  - ✚ Culture organisations
  - ✚ Social, welfare organisations
  - ✚ Sports organisations
  - ✚ Political and other community organisations
  - ✚ Traditional leader (if there is one)
  - ✚ Small farmers organisations
- Representatives of the business sector
- State departments and semi-state departments

- Any other interested group or organisations that can make a contribution.

## B.5 Comments

All received comments have been incorporated in either the WSDP or the IDP. Copies of the individual comments are too numerous for inclusion into this document but are available for perusal at the municipal offices.

## B.6 Adoption Record

***This Water Services Development Plan is hereby adopted as the official plan of the council and ratified by Council Decision with reference \_\_\_\_\_ on this \_\_\_\_\_ day of \_\_\_\_\_ in the year 20\_\_\_\_.***

## B.7 WSDP Coordinator

| Name:         | Designation:                 | Role:                 | Contact Address                                                                                            |
|---------------|------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------|
| Mr P Viviers  | Director: Technical Services | Municipal coordinator | //Khara Hais Municipality<br>Cnr of Mutual and Scott Streets<br>UPINGTON<br>8800<br><br>Tel: 054- 332 5911 |
| Mr GH Meiring | Technical consultant         | Technical support     | BVi Consulting Engineers<br>7 Murray Avenue<br>UPINGTON<br>8800<br><br>Tel: 054 -337 6600                  |

## B.8 General

|                                                                                     |     |    |
|-------------------------------------------------------------------------------------|-----|----|
| 1. Does the WSA have a Service Level Policy for water?                              | Yes | No |
| 2. Does the WSA have a Service Level Policy for sanitation?                         | Yes | No |
| 3. If no, when will such a policy be in place?                                      | Yes | No |
| 4. Does the WSA have a Community participation plan for selection of Service Level? | Yes | No |
| 5. If no, when will such a Plan be in place?                                        | Yes | No |

## Water Service Level Policy

The provision of safe and sufficient water according to minimum RDP standards, to all sites within the //Khara Hais municipal area, by 2007. The current service levels for water can be summarized as follows:

### **Minimum requirements:**

- A minimum quantity of potable water of 25 liters per person per day
- All connections to have a minimum pressure of at least 100kPa
- A minimum flow of 10 liters per minute
- Effectiveness of not more than 7 days interruption of supply per year

### **Connections and metering:**

- Informal settlement : Uncontrolled volume standby within 200m of households
- Formal sub-economic: Controlled volume with prepaid metered yard connection
- Formal economic: Uncontrolled volume with conventionally metered yard connection
- Business & Industry: Uncontrolled volume with conventionally metered yard connection

## Sanitation Service Level Policy

The provision of sustainable and acceptable sewerage and sanitation services according to minimum RDP standards, to all sites within the municipal area of //Khara Hais Municipality. The current service levels for water can be summarized as follows:

### **Minimum requirements:**

The provision of a toilet that is:

- safe, reliable and environmentally sound,
- easy to keep clean,
- provides privacy and protection against weather
- Is well ventilated
- Keeps odours to a minimum
- Prevents the entry and exit of flies and other pests

### **Technical Options applied:**

- Informal settlement : Temporary nightsoil buckets removed weekly
- Formal sub-economic(rural): Double pit VIP or UDS toilet
- Formal sub-economic(urban): Full waterborne sewerage
- Formal economic: Full waterborne sewerage
- Business & Industry: Full waterborne sewerage

## Community participation plan

It is of the utmost importance that all projects, programmes and actions as stipulated in this document, be communicated to the public on a regular and continuous basis by means of a structured public participation process. This process must be seen in the same light as the public awareness campaign which was followed at the commencement of the project. The importance of a continuous communication and feedback process lies in the fact that it helps to ensure the sustained involvement in and acceptance of the plan by the community. The community must therefore take responsibility for the plan and the development process on an on-going basis. It is only in this way that the envisaged projects and actions can be implemented.

## Section C - Executive Summary

### C.1 Essential Questions

#### What is the Backlog?

| Needs:                    |                          |             |                               |             |
|---------------------------|--------------------------|-------------|-------------------------------|-------------|
| Water Works Service Area: | Water needs to RDP level |             | Sanitation Needs to RDP level |             |
|                           | Technical:               | Management: | Technical:                    | Management: |
| //Khara Hais              | 2166                     | 2166        | 2970                          | 2970        |
| Total                     | 2166                     | 2166        | 2970                          | 2970        |

The exact needs in terms of backlogs remains problematic to quantify. It is suggested that a house to house survey be conducted by the municipality and that this data is captured on the municipal GIS system. The system should then be updated whenever capital projects are implemented that address these issues. **Current available data is not accurate.**

#### What is the status of supply to higher levels of service?

| Present Service Levels |           |            |       |
|------------------------|-----------|------------|-------|
| //Khara Hais           | Basic RDP | High > RDP | Urban |
| Upington proper        | 153       | 4993       | 5741  |
| Lambrechtsdrift        | 185       |            |       |
| Karos                  | 321       |            |       |
| Leerkrans              | 240       |            |       |
| Leseding               | 233       |            |       |
| Ntsikelello            | 172       |            |       |
| Louisvale Dorp         | 236       |            |       |
| Raaswater              | 543       |            |       |
| Kalksloot              | 452       |            |       |

### Cost of Eradicating backlogs

| Typical Required Water Sector Cash Flow to meet Target Dates of 2008 for Water Services and 2010 for Sanitation Services |                  |                   |                  |                  |                  |                  |                   |
|--------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|------------------|------------------|------------------|------------------|-------------------|
|                                                                                                                          | 05/06            | 06/07             | 07/08            | 08/09            | 09/10            | 10/11            | Total             |
| //Khara Hais                                                                                                             |                  |                   |                  |                  |                  |                  |                   |
| Bulk Water Supply system                                                                                                 | 4 100 000        | 1 035 000         |                  |                  |                  |                  | 5 135 000         |
| Village reticulation and cost recovery                                                                                   | 885 000          |                   |                  |                  |                  |                  | 885 000           |
| Household sanitation                                                                                                     | 2 268 630        | 7 830 000         | 1 680 000        |                  |                  |                  | 11 778 630        |
| Rehabilitation                                                                                                           | 1 635 000        | 1 635 000         | 1 635 000        | 1 635 000        | 1 635 000        | 1 635 000        | 9 810 000         |
| <b>TOTALS</b>                                                                                                            | <b>8 888 630</b> | <b>10 500 000</b> | <b>3 315 000</b> | <b>1 635 000</b> | <b>1 635 000</b> | <b>1 635 000</b> | <b>27 608 630</b> |

### What is the strategy to eradicate backlogs?

- Bulk water supply to be provided in all villages and upgraded in Upington
- Village reticulation to be extended to accommodate new formal stands
- Prepaid water metering to be installed to provide Free Basic Water and to aid cost recovery when excess is used.
- All households in villages to be provided with dry –on-site sanitation.
- All areas in Upington to be provided with full waterborne sanitation
- Maintenance and rehabilitation of existing infrastructure to be continuous

### Impacting factors

- Municipal technical capacity
- Funding

### What is the status of all Water Infrastructure?

The //Khara Hais water and sewage infrastructure is currently in a good condition and being fairly well operated and maintained.

The infrastructure of surrounding villages with regards to water is well developed and operational. Sanitation needs in villages are still lacking in some areas.

### Effective Management

The water and sanitation systems are currently reasonably well managed by knowledgeable staff. The capacity to do this is however slowly declining with the retirement and resignation of experienced and well qualified staff.

### Socio Economic Profile

The //Khara Hais area is currently inhabited by some 72 476 persons who live in 14 607 households. There are approximately 9 310 migrant workers that live in the area seasonally.

#### **Service Level Profile**

//Khara Hais currently provides a high level of service in Upington proper and a basic service in the surrounding villages. The service in the villages is higher than RDP standard for water and equal to RDP standard for sanitation.

#### **Water Resource Profile**

The Orange River is the primary resource for //Khara Hais. It is a sustainable river with acceptable water quality that varies considerably. The occurrence of seasonal algae blooms and slowly increasing salinity are worrying factors which may impact on service levels in future.

#### **Water Conservation and Demand Management**

This issue is currently not being well addressed. The installation of prepaid water metering in the indigent areas to manage the demand as well as the installation of zone metering in Upington is however a big stride forward to address this serious issue.

#### **Water Services Infrastructure Profile**

The infrastructure in Upington is well developed and able to deliver a good service in terms of water supply and sanitation. The Abraham Holbors September Water Treatment Plant has a current capacity of 64 megaliters per day and can be upgraded to 80 megaliters per day with relatively small expenditure. The Kameelmond Sewage Treatment Plant is currently operating at 70% of its design capacity. All the main villages have now been equipped with package type water treatment plants varying in size from 12 to 20 cubic meters per hour. The Upington reticulation systems are continuously being upgraded and extended to meet the rising demand.

#### **Water Balance**

The current water balance indicates large losses. This is probably due to incomplete data and a fair amount of unaccounted for water. The municipality seriously needs to address this situation as calculations indicate losses of 38% currently.

Incomplete data and lack of zone metering to verify consumption has to date made the accurate calculation of a water balance very difficult. The projects to address this are currently underway and should make this calculation more realistic in future.

#### **Water Services Institutional Arrangements**

//Khara Hais Municipality is currently the Water Service Authority as well as Water Service Provider for its management area. Occasional use is made of support agents when awareness and so forth need to be addressed. The municipality is currently well staffed although the pool of experience in especially the technical departments is declining.

#### **Customer Service Profile**

A customer care center has been implemented and is operating at an acceptable level.

#### **Financial Profile**

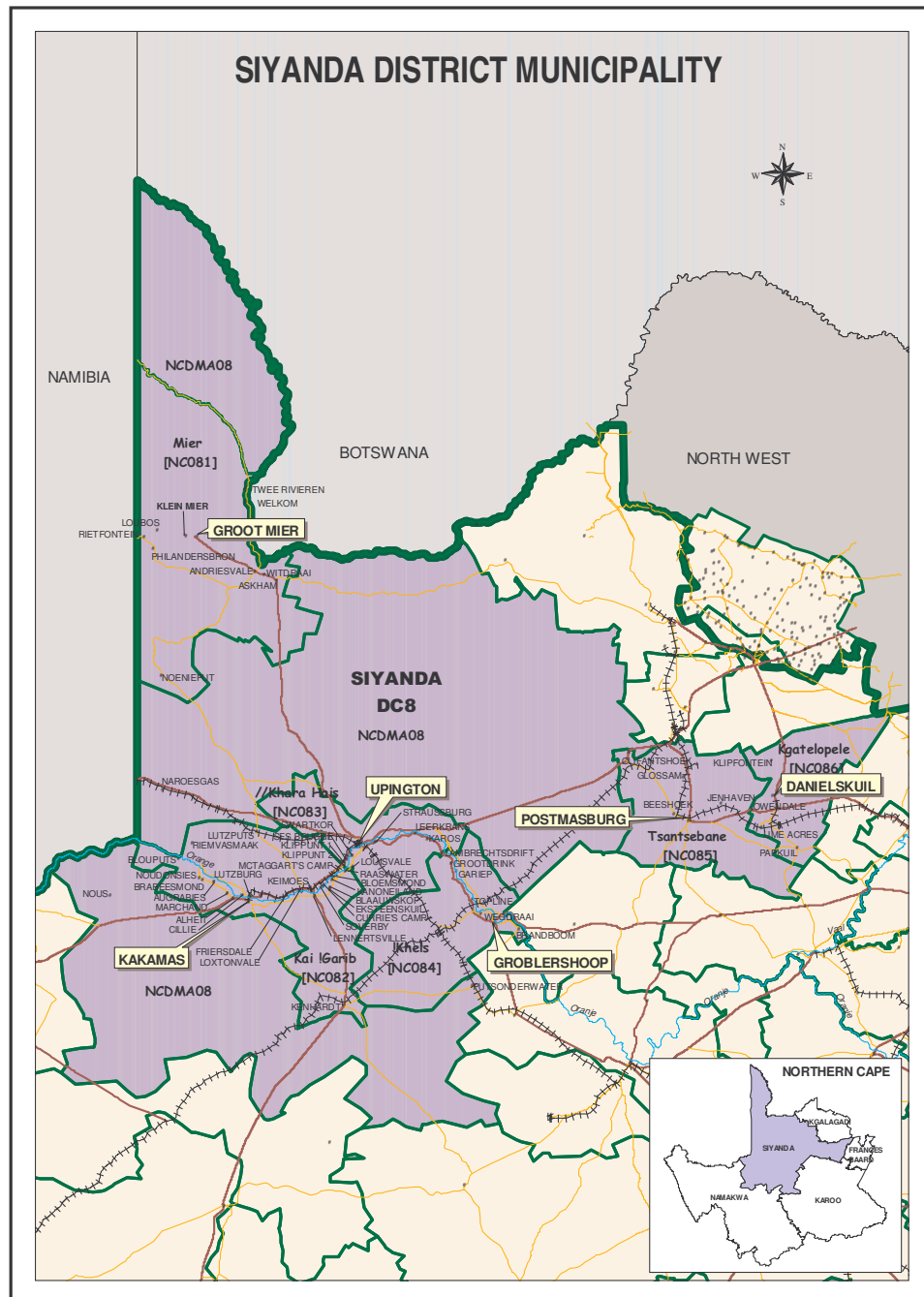
The finances of the //Khara Hais Municipality are currently fairly healthy and cashflow is still positive. The rates and taxes have however increased severely over the last 3 years and the municipality should guard against consumer resistance. The municipality has a Credit Control Policy in place as well as a Free Basic Water Policy which is being applied.

#### **List of Projects**

The detailed capital expenditure program is currently in place for a 3 year period which lists all projects to be implemented from 2005 to 2007

## Section D - Background to the //Khara Hais area

### D.1 Location



## D. 2 Water Services Authority perspective

### D. 2.1 Longitude and Latitude

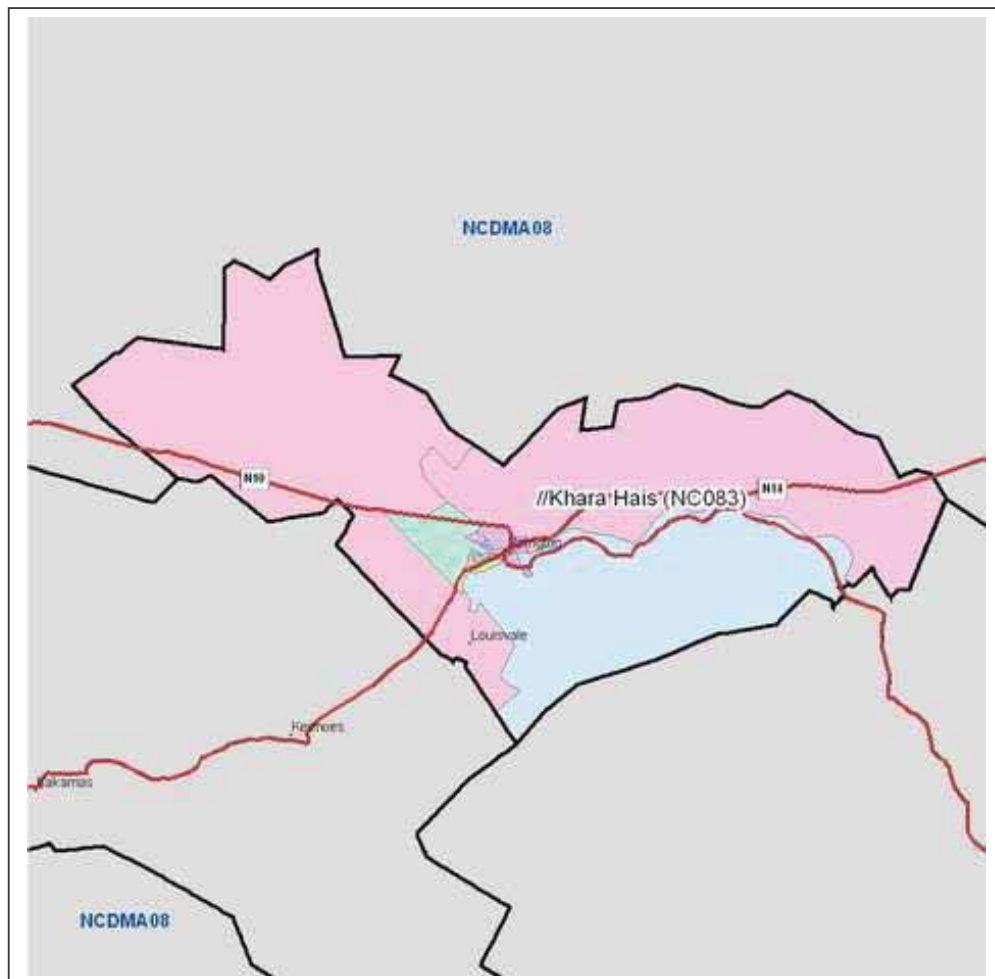
Upington is located at :      South 28° 27"  
East 21° 14"

### D 2.2 Local Government Type

Upington is classified as a Local Municipality

### D 2.3 Management Area

The //Khara Hais Municipality's management area comprises 3 444.224 km<sup>2</sup> of which approximately 4 782 ha consist of built-up areas.



#### D 2.4 Towns/Villages/Communities within management area

The //Khara Hais Municipality comprises the following towns and villages:

The main town is Upington with the following villages located in a radius of 60km around it:

Lambrechtsdrift  
Karos  
Leerkrans  
Ntsikellelo  
Leseding  
Louisvaledorp  
Raaswater  
Kalksloot

See attached map indicating locations of villages.

#### D 2.5 Settlement Patterns

| Town/Village               | Population | Settlement Pattern | Type   |
|----------------------------|------------|--------------------|--------|
| Upington                   | 58 847     | Urban              | Formal |
| Leerkrans                  | 8 911      | Village            | Formal |
| Karos                      |            | Village            | Formal |
| Lambrechtsdrift            |            | Village            | Formal |
| Ntsikellelo                |            | Village            | Formal |
| Leseding                   |            | Village            | Formal |
| Louisvaledorp              |            | Village            | Formal |
| Raaswater                  |            | Village            | Formal |
| Kalksloot                  |            | Village            | Formal |
| Farms and irrigation erven | 4 718      | Farmlands          | Rural  |

#### D 2.6 Land Use of the WSA

The //Khara Hais municipal area consists of three sections, namely a ribbon-shaped main town situated along the Orange River (Upington), a narrow intensive agriculture strip on both sides of the river with various satellite communities in the form of settlements about 15 to 20 kilometres apart, and the rest of the area consisting of extensive stock farms. There is a well-defined business centre for Upington with supplementary individual and residential centres spread out over the rest of the area.

Low density residential areas are found mainly on the western and north-western sides of the central business district, with the exception of one area on the eastern side. Medium and high density residential areas are found mainly to the north of the central business district.

Two well-established industrial areas are situated to the north of the business area, with further expansion possibilities to the west of these.

The areas with the most employment opportunities stretch from the central business district situated along the Orange River, north and north-east up to and including the industrial area.

Because of the influence of the river on the southern side of the town, most vacant land suitable for development is found north, north-west and east of the central business district.

A strong, well-developed recreation-orientated component is to be found on the banks of the Orange River, directly south of the central business district.

### **D .3 Physical Perspective**

#### **D 3.1 Topography**

The main town of the //Khara Hais Municipality is mainly located to the north of the Orange River. The landscape is typically valley-like with various dry river beds intersecting the town. Further north of Upington, the landscape changes to a semi-desert with sandy plains and dunes. South of the Orange River there are many small hills and a more undulating landscape is found. The Orange River flows from east to west past Upington. The geology of the area comprises gneiss, granite and amphibolites which are often disturbed by limestone silicates, quartz and pegmatites. The upper layers are covered by weathered gneiss, quartzite sand and the common red Kalahari dune sand. All soils in the Orange River valley are alluvial in nature and most soils are of the Augrabies form (Ortic A horizon on neo-carbonates).

#### **D 3.2 Climate**

The average summer temperature varies between 18°C and 36°C with extremes of up to 43°C. The hottest months are between December and February. Winter temperatures are mild and vary between 3°C and 23°C.

Humidity varies between 16% and 80% in summer and between 26% and 90% in winter.

Rain usually comes early in the spring and then again between February and April. The region has an average rainfall of 184 mm per year.

Evaporation is typical of semi-arid regions and is approximately 2 100mm per annum but can on occasion rise to above 3 000mm.

The prevailing winds are northerly and westerly.

Water consumption in the summer is more than double that consumed in winter due to the extreme summer temperatures. This has lead to water treatment facilities being abnormally large in comparison with the population.

#### **D 3.3 Natural Environment**

The biodiversity of the //Khara Hais management area is unique and relatively healthy. Two distinct veld types occur, namely the Orange River broken veld and the Kalahari dune veld. Both types have a huge diversity of both plant and animal species which are endemic to the respective types.

The flow of the Orange River through a semi arid landscape creates interesting contrasts of aquatic species and drought resistant species. Differences such as the wild olive tree and the river willow as well as the various aloes and acacia species are found within short distances of each other. Most of the natural habitat adjacent to the river is no longer pristine due to construction of dams further upstream and the major impact agricultural development has had. The overgrazing which occurs in some of the rural areas, together with the ever increasing need for development are examples of the pressure being exerted on the natural environment.

According to PRECIS of the National Botanical Association there are no endangered species in the area. The Camelthorn Tree (*Acacia Erioloba*) and the Quiver Tree (*Aloe Dichotoma*) are protected and may not be touched without the necessary permit from the Department of Water Affairs and Forestry.

Invader species such as the *Prosopis Glandulosa* should however be eradicated to avoid further distribution and growth.

#### **D.3.4 Main Infrastructure development**

##### **Transport**

All main roads into the //Khara Hais area are paved as are 95% of Upington's streets. The Upington Airport has 3 paved runways with 6 landing directions inclusive of the longest runway in Africa. There are daily passenger flights to both Johannesburg and Cape Town and the airport is also utilized as a cargo hub for fresh produce to Europe, the Middle East and the USA.

//Khara Hais has rail connections to Namibia, De Aar and Kakamas. Trains are no longer a regular service and when scheduled, are utilized mostly for transport of freight.

##### **Water**

Purified water is available at yard connections for most households in the municipality. Water in Upington is abstracted from the Orange River and purified at a 64 megaliter per day treatment plant. The smaller villages are equipped with independently operated package treatment plants ranging in size for 9 cubic meters per hour to 12 cubic meters per hour capacity. The village of Kalksloot is supplied by pipeline from the Upington reticulation network.

##### **Sanitation and Wastewater**

Full waterborne sewage with flush toilets are available in Upington. Upington is equipped with an activated sludge wastewater treatment plant with a capacity of 16 megaliters per day as well as a 800 cubic meter per day oxidation pond system located at Louisvale Road. The other small villages have a combination of concervancy tanks and dry sanitation which are mostly of the double pit VIP type or urine diversion type.

##### **Police Stations**

Upington has both the main SAPS station as well as the office of the Area Commissioner for Gordonia. In addition there are three satellite police stations located in the suburbs of Paballello and Rosedale as well as the village of Louisvale.

##### **Magisterial Offices**

The regional magistrates office is located in Upington.

### **Schools**

The municipal management area has 7 high schools and 23 primary schools.

### **Clinics**

The municipal clinics and primary health services were transferred to the Siyanda District Municipality and are no longer a function of the //Khara Hais Municipality.

### **Hospitals**

Upington presently has the following two hospitals:

- Upington Mediclinic Private Hospital
- Gordonia Provincial Hospital

A new referral hospital is currently in the process of construction.

### **Prisons**

The Department of Correctional Services operate a prison in Upington designed for 800 inmates.

### **Industries**

There are several industries in Upington of which the following have a meaningful impact:

- SA Dried Fruit Co-operative
- Karakul Agricultural Co-operative
- Suppliers of building materials- (Federated Timbers, Lumber City, etc)
- KWV distillery and extraction plant
- SASKO
- McDonald's Transport
- Orange River Wine Cellars
- Production of beta-carotene
- Several salt refineries

### **Mining**

There are no large scale mining activities in the municipal area. Stone and sand mining for aggregate production takes place on a small scale.

### **Agriculture**

Upington is largely driven by agricultural activities in the form of intensive vineyard cultivation under irrigation for the production of raisins, wine grapes and export quality fresh produce. Smaller scale cultivation of maize, wheat and Lucerne also takes place. In addition to the above, extensive stock farming is practiced widely throughout the municipal area by both commercial and emergent farmers. The advent of the Kalahari-East and Kalahari-West Stock Watering Schemes in the late 1980's has made this type of farming a lot more commercial.

### **Resorts and Tourism**

The Island Resort at Upington is a popular overnight destination for visitors to the Kgalagadi Transfrontier Park and Namibia. There are several other small privately owned resorts in the municipal area.

### **Conservation Areas**

There are no national parks in the //Khara Hais area of jurisdiction. The Spitskop Nature Reserve 13km outside Upington is a small municipal owned, privately operated reserve.

## **D .4 Demographic perspective**

### **D 4.1 Economics**

#### **D4.1.1 Macro**

In national terms the Northern Cape can be defined as a large province with a relatively small economy. The Northern Cape makes a contribution of roughly 1.8% of the national gross domestic product while it comprises some 29.7% of the country's total area. The Northern Cape's largest contributors being in the mining and agricultural sectors while sectors such as manufacturing and construction are relatively under developed. In spite of this fact, inhabitants of the Northern Cape have a relatively high per capita economic output when compared with the rest of South Africa. The agricultural sector, although strong is losing ground due to intensifying capital requirements whilst the Tourism sector is currently the fastest growing sector in the Northern Cape. The current unemployment rate of 26% is slightly below the national average while the Human Development Index is 0.68% below the national index. Poverty is a tremendous problem with a high number of households living below the poverty line. The income per capita is lower than the provincial level in each one of the economic sectors.

#### **D4.1.2 Micro**

The micro economy of the //Khara Hais region is centred in Upington and surrounds. The town's economy is largely driven by the agricultural sector. Upington is primarily the service center for both the intensive grape industry, which comprises raisin production, fresh table grapes for export and a large wine-making industry as well as the extensive farming of sheep, goats and cattle in the Kalahari and south of Namibia. The //Khara Hais economy is relatively healthy with an economic growth of between 3% and 4% per annum.

The tourism sector is also fast becoming a major contributor to the regions economy. If the latest growth trends continue, it is foreseen that tourism could become the third largest sector in the regions economy within 10 years. The semi-desert landscapes and the close proximity of attractions such as the Augrabies Falls National Park and the Kgalagadi Transfronteir Park are major factors contributing to the growth of this sector.

A niche sector which is in a developmental stage in Upington is the biotechnology industry. A private investor has constructed a first phase production facility to produce anti-oxidants organically. This industry is water intensive and can become a major factor in years to come.

### **D 4.2 Social**

The socio-economic characteristics of a municipality are critical when it comes to future planning for infrastructure and services. The information in this section is drawn from the //Khara Hais Socio-economic Survey conducted in 2002 for its entire area of management.

#### **D 4.2.1 Population Size**

The official number of inhabitants for //Khara Hais is calculated as :

|                            |   |            |
|----------------------------|---|------------|
| Upington                   | : | 58 847     |
| Rural villages             | : | 8 911      |
| Farms and Irrigation areas | : | 4 718      |
| <br>Total population       | : | <br>72 476 |

#### **D 4.2.2 Projected Population Growth**

Over the past two decades population growth in both the Northern Cape and Upington has been fairly slow and future projections indicate that this is unlikely to change.

Analysis of the historically available data indicate that the natural population growth for the //Khara Hais area is between 1.5% and 2% per annum. This indicates a gradual outward migration of people to other parts of South Africa. Projections at a rate of 2% per year indicate that the population of //Khara Hais should increase to a figure of 88 348 within the next ten years.

#### **D 4.2.3 Poverty**

The 2002 socio-economic survey shows that the average gross monthly income per family in the //Khara Hais area is approximately R4 000-00 per month. The average gross income per capita is just under R1000-00 per month and in excess of 66% of the area's population have a per capita income of less than R800-00 per month.

#### **D 4.2.4 Education**

The largest portion of the population (26%) in the //Khara Hais area has an educational level of Grades 8 to 10. Only 19% of the population finish high school with a Grade 11 or 12 level of education and less than 3% of the population have tertiary education qualifications. Although these figures seem low, they are around 5% higher than those derived from a survey done in 1997 indicating positive growth in average education level.

#### **D 4.2.5 Security**

The //Khara Hais Municipality is a relatively safe place to reside in. The South African Police Service crime statistics for 2006 have recently been released and Upington and the surrounding area is virtually free of crimes such as carjacking, bank robbery and cash in transit heists that take place on a daily basis in larger centers. There are however quite a serious number of petty crimes such as theft from motor vehicles, burglary and assault that are commonplace. Many of these crimes are the result of social problems and alcohol abuse taking place.

### **D .5 Regional Perspective**

#### **D 5.1 Neighbouring Authorities**

The //Khara Hais Municipality is bordered by the following neighbouring authorities:

- The Siyanda District Municipality whose management area encompasses //Khara Hais.
- Kheis Municipality to the south of Upington
- Kai !Garib Municipality to the west of Upington
- Tsantsabane Municipality to the east.

#### **D 5.2 Institutional Structures**

The regional institutional structures of importance to //Khara Hais are the following:

- Office of the Northern Cape Premier
- Northern Cape Provincial Government Departments
- Siyanda District Municipality

#### **D 5.3 Social and Economic perspective**

The Northern Cape has the lowest population density of all South Africa's provinces. In addition, it is the only province that shows an absolute decline in formal sector employment.

According to a report published by the Human Sciences Research Council (HSRC) on Service needs and provision in the Northern Cape, formal sector employment declined by about 20% between 1980 and 1991. This was mainly due to the decline in the mining sector and the vulnerability of agriculture in the area. More than one in every five formal sector jobs was lost during this period, leaving formal employment heavily concentrated in the government. The latter provided 34% of all employment, followed by agriculture (22%) and mining (12%). Together these three sectors provided nearly 70% of all formal sector employment in the province in 1991.

Although there has been a significant rise in informal sector activity throughout the province, unemployment is undoubtedly increasing in the Northern Cape. The lack of emerging sectors in the province makes the problem of job creation particularly acute.

Two-thirds (66%) of the people in the province live in the northern and north-eastern regions, mainly as a result of mining activities around Kimberley, Barkley West, Postmasburg and Alexander Bay. Kimberley itself accounts for 23% of the province's population.

The southern districts, where the economies are based on agriculture (more specifically stock farming) are sparsely populated. They do however boast a higher level of service provision than the rest of the province. Victoria West is far better serviced than its immediate northern and eastern neighbours of Prieska, Britstown and Richmond. Likewise, Calvinia is better serviced than Namaqualand and Kenhard, its northern and western neighbours. Kuruman is one of the few better serviced districts in the north.

Districts with a per capita poverty gap of over R500 are located in the southern and south-eastern parts of the Northern Cape, with Williston being the worst off. The Northern Cape has the lowest population density of all South Africa's provinces. In addition, it is the only province that shows an absolute decline in formal sector employment.

The government are currently supporting poverty alleviation programmes from National Government. The provincial Expanded Public Works Programme (EPWP) was implemented during 2005, mainly on road related projects. The province also has been doing most of the maintenance work on road sides and storm water drainage structures by making use of labour intensive methods. Most of the old provincial roads have recently been taken over by the South African Roads Agency Limited.

The economy of Northern Cape is heavily dependent on the primary sector, which in 2002 made up 31.0 per cent of GDP. The largest sector is mining, which has declined in contribution to the GDP from 25,8 per cent in 1996 to 23,7 per cent in 2002. Agriculture, however, increased in its contribution from 6,2 per cent to 7,3 per cent. A limited amount of processing of the primary commodity output in mining and agriculture takes place in the Northern Cape. Manufacturing contributes only 4,2 per cent towards the GDP. The average real economic growth rate of the Northern Cape over the period 1996 to 2002 was 1,4 per cent. This is lower than the average real economic growth rate of South Africa over the same period of 2,8 per cent.

The provincial budget comprises of 98 per cent of funds received from national government and 2 per cent from own revenue.

Unemployment rate increased from 28,3 per cent to 33,4 per cent between 1996 and 2001. The Trade SA website recently reported that the Northern Cape region has an unemployment rate of 14.4 per cent.

#### **D 5.4 Towns and Villages**

Upington, being the center of the //Khara Hais management area is bordered by the following towns:

- Olifantshoek (east)
- Groblershoop (south)
- Keimoes (west)
- Askham (north)

There are numerous smaller community settlements and villages along the Orange River that all utilize Upington as a major center.

#### **D 5.5 Physical**

Next to Sol Plaatje Municipality in Kimberley, //Khara Hais is the largest local municipality in the Northern Cape Province. Most of the other town in the Northern Cape, including Kimberley, are situated within a 400km radius of Upington.

#### **D 5.6 Demographics**

The population group demographics for the Northern Cape are as follows:

| <b>African/Black</b> | <b>Coloured</b> | <b>Asian</b> | <b>White</b> |
|----------------------|-----------------|--------------|--------------|
| 46.51%               | 42.92%          | 0.24%        | 10.34%       |

#### **D 5.7 Co-operation and interdependence**

Co-operation between municipalities is currently limited due to various reasons of which financial health is one. The Department of Housing and Local Government are now in process of establishing Operations and Maintenance Support Units on a regional basis.

Said units are to be centered at district municipality level to lend support to smaller municipalities with regards to infrastructure operations and maintenance.

#### **D 5.8 Distance**

Distances to other larger towns are as follows:

- Johannesburg:796km
- Pretoria:830km
- Cape Town:894km
- Bloemfontein:588km

## **Section E - IDP and WSDP goals and Integration**

### **E .1 IDP priority issues related to water services**

After several community participation meetings in each of the wards, as well as after several IDP Representative Forum Meetings, the above-mentioned analysis was taken into consideration and the following issues were prioritised as developmental issues for //Khara Hais Municipality for the year 2005/2006:

1. Water
2. Sanitation
3. Housing
4. Health and HIV/AIDS
5. Economic Development
6. Roads and Transport
7. Electricity
8. Land Use Management
9. Parks, Recreation Facilities and Cemeteries
10. Safety and Security
11. Social and Community Facilities
12. Functioning of the Local Authority
13. Tourism
14. Storm water

### **E .2 Sustainable Water Services sub-goals**

- Improvement & upgrading of water networks
- Extension of water networks
- Planning and management of water networks
- Maintenance and upgrading of bulk water installations
  
- Upgrading and maintenance of existing sewerage network
- Extension and supply of new sewerage network
- Extension and upgrading of bulk sewerage infrastructure
- Improvement and upgrading of sanitation facilities

### **E .3 Integrated water resource management sub-goals**

- Responsible utilization of the current resources in a legally compliant manner
- Implementation of a water conservation/demand management strategy
- Effective management of networks to minimize losses
- Consumer education to create public awareness with regards to the value of the resource
- Prevention of pollution by the implementation of effective wastewater treatment and suitable maintenance of existing systems.

### **E.4 Efficient and effective water services institutional arrangements sub-goals**

- The provision of suitably qualified personnel to manage and maintain the existing water and sanitation infrastructure.
- The implementation of an effective billing and credit control system to recover value
- The investment of capital in the form of own funds, grants and loans to meet the consumer demand in terms of water services.

## Section F - Water Services Business Elements

### F.1 Socio-economic Profile

#### F.1.1.1 Situation Assessment

##### F.1.1.1.1 Current Consumer Profile

| Town /Village   | Settlement Type | Information                                                                                                                                                                               |                                               |
|-----------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Upington        | Urban           | Total population:<br>No. of household consumer units:<br>No. of Dry Industrial consumer units:<br>No. of Wet industrial consumer units:<br>No. of Commercial consumer units:<br>No. other | 58 861<br>10 734<br>176<br>25<br>361<br>2 123 |
| Lambrechtsdrift | Village         | Total population:<br>No. of household consumer units:<br>No. of Commercial consumer units:<br>No. other                                                                                   | 672<br>153<br>0<br>0                          |
| Leerkrans       | Village         | Total population:<br>No. of household consumer units:<br>No. of Commercial consumer units:<br>No. other                                                                                   | 1 511<br>211<br>1<br>0                        |
| Karos           | Village         | Total population:<br>No. of household consumer units:<br>No. of Commercial consumer units:<br>No. other                                                                                   | 1 402<br>262<br>0<br>0                        |
| Ntsikellelo     | Village         | Total population:<br>No. of household consumer units:                                                                                                                                     | 663<br>132                                    |
| Leseding        | Village         | Total population:<br>No. of household consumer units:<br>No. of Commercial consumer units:                                                                                                | 1 588<br>307<br>1                             |
| Louisvale Dorp  | Village         | Total population:<br>No. of household consumer units:<br>No. of Commercial consumer units:                                                                                                | 1 350<br>249<br>6                             |
| Raaswater       | Village         | Total population:<br>No. of household consumer units:<br>No. of Commercial consumer units:                                                                                                | 2 276<br>519<br>1                             |
| Kalksloot       | Village         | Total population:<br>No. of household consumer units:<br>No. of Commercial consumer units:                                                                                                | 1 996<br>272<br>1                             |
| Farmlands       | Farming         | Total population:<br>No. of household consumer units:<br>No. of Commercial consumer units:<br>No. other                                                                                   | 4 447<br>40<br>28<br>92                       |

#### F.1.1.1.2 Poor household definition

There is no commonly accepted definition of poverty in South Africa. At present the Equitable Share of national revenue transferred to local government is based largely on expenditure as an indicator of poverty which is currently listed as R1 100-00 per month. The national policy does not define "poor" and local government needs to define local poverty indicators and then identify which and how many households fall within the local definition.

***The //Khara Hais Municipality define the poverty threshold as R1 480-00 per month***

#### F.1.1.1.3 Present population and projected population growth rates

| YEAR | TOTAL  | AVERAGE ANNUAL GROWTH |
|------|--------|-----------------------|
| 1921 | 2 623  |                       |
| 1936 | 6 280  | 6%                    |
| 1946 | 10 154 | 5%                    |
| 1951 | 13 303 | 6%                    |
| 1960 | 20 366 | 5%                    |
| 1970 | 28 632 | 3.5%                  |
| 1991 | 47 066 | 3.5%                  |
| 1997 | 55 334 | 3%                    |
| 2002 | 58 861 | 1.3%                  |
| 2005 | 72 476 | 2.0%                  |

#### Sources

1. Central Statistical Services.
2. Central Statistical Services **less** figure for Paballelo **plus** figure for Paballelo as per Socio-Economic Survey 1991 (Macroplan).
3. Socio-Economic Survey 1997 (Macroplan).

The natural population growth for the Northern Cape is probably in the region of 1,5 – 2,0% annually. Because the actual population growth for the Northern Cape, and possibly also //Khara Hais, is in the region of 1,0 to 1,5% per year, this means that there is an overall outward migration of people from the Northern Cape to other parts of South Africa. As long as the economic development of the province is slower than that of the rest of the country, the outward migration of population will in all probability continue.

According to calculations the population of //Khara Hais should increase during the period from 2002 to 2012 **from 72 476 to 88 348** persons, with a further increase of up to 107 696 from 2012 to 2022. These figures represent a growth of **2,0%** in the total population.

#### F.1.1.1.4 Demographic trends and migration patterns

| Area         | Information                     |                   |
|--------------|---------------------------------|-------------------|
| //Khara Hais | Total population:               | 72 476            |
|              | Peak daily labor migration:     | ±25.5             |
|              | Peak long-term labor migration: | - 9 310<br>+9 422 |
|              | Permanent population changes:   | +9 422            |
|              | Holiday population:             | + 725             |

#### F.1.1.1.5 Age and Gender Profile

| Area         | Information                   |        |
|--------------|-------------------------------|--------|
| //Khara Hais | Total population:             | 72 476 |
|              | Aged residents (> 65 years):  | 1 579  |
|              | Youth residents (< 18 years): | 32 497 |
|              | Male residents:               | 34 011 |
|              | Female residents:             | 38 465 |

## F 1.2 Health

### F 1.2.1 Situation Assessment

#### F 1.2.1.1 Health profile

| Area         | Information                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| //Khara Hais | Number of Health facilities:                                       | 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|              | Type of Facilities:                                                | 2 Hospitals<br>16 Clinics                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|              | Location:                                                          | Gordonia Hospital :Upington<br>Mediclinic Private Hospital: Upington<br>Leerkrans Clinic<br>Karos Clinic<br>Straussburg Clinic:Ntsikellelo Village<br>Lambrechstdrift Clinic<br>Raaswater Clinic<br>Louisvaledorp Clinic<br>Leseding Clinic<br>Wes-Rand Clinic<br>Progress Clinic : Upington<br>Upington Clinic<br>Sarah Strauss Clinic : Upington<br>Lingeletu Clinic : Upington<br>Louisvaledorp Clinic<br>Kalksloot Clinic<br>Icanos Clinic<br>Uap Clinic<br>Kalksloot Islands Clinic |
|              | Accessibility:                                                     | All clinics are permanent buildings located centrally in suburbs or villages and easily accessible by foot or vehicle.                                                                                                                                                                                                                                                                                                                                                                   |
|              | Water Quantity:                                                    | 500 liters per day per clinic                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|              | Water related diseases:                                            | Cholera has never occurred in //Khara Hais area. Occasional outbreaks of diahorea do occur but not necessarily from water.                                                                                                                                                                                                                                                                                                                                                               |
|              | Access to sanitation:                                              | In excess of 85% of the population have access to suitable sanitation.                                                                                                                                                                                                                                                                                                                                                                                                                   |
|              | Lack of adequate sanitation and prevalence of water-borne diseases | Only squatters occupying informal settlements have no permanent sanitation facilities. They are still serviced by buckets. There is no data available supporting the prevalence of water-borne disease in these areas.                                                                                                                                                                                                                                                                   |

//Khara Hais municipality is no longer responsible for the operation and administration of primary health care clinics in their management area. This function has been taken over by the provincial Department of Health.

### F 1.3 Employment and Income

#### F 1.3.1 Situation Assessment

##### F 1.3.1.1 Employment Profile

| Area         | Information                       |         |
|--------------|-----------------------------------|---------|
| //Khara Hais | Eligible Workforce (19-65years)   | 33642   |
|              | Permanent Residents without jobs: | 15877   |
|              | Seasonal farm workers:            | 9310    |
|              | Temporary domestic workers:       | No data |
|              | Permanent farm workers:           | 2877    |
|              | Permanent industry workers:       | 12702   |
|              | Professional workers:             | 708     |

##### F 1.3.1.2 Household Income

| Wylk    | Cell     | Woongebiede              | Huishouding se bruto maandelikse Inkomste in Rand |              |               |               |               |         |        |
|---------|----------|--------------------------|---------------------------------------------------|--------------|---------------|---------------|---------------|---------|--------|
|         |          |                          | 0 tot 800                                         | 801 tot 1500 | 1501 tot 2500 | 2501 tot 3500 | 3501 tot 5000 | Bo 5000 | Totaal |
| Wylk1   | Cell 1A  | Gedeelte van "Berge"     | 275                                               | 81           | 37            | 28            | 9             | 7       | 417    |
|         | Cell 1B  | Koppe                    | 330                                               | 89           | 55            | 31            | 6             | 3       | 484    |
| Wylk 2  | Cell 2A  | Morning Glory            | 345                                               | 64           | 64            | 64            | 26            | 90      | 653    |
|         | Cell 2B  | Gedeelte van Rosedale    | 213                                               | 125          | 109           | 91            | 16            | 31      | 585    |
| Wylk 3  | Cell 2C  | Jurgens Stadion          | 418                                               | 82           | 16            | 9             | 3             | 9       | 537    |
|         | Cell 3A  | Bellvue                  | 180                                               | 62           | 31            | 39            | 47            | 20      | 359    |
| Wylk 4  | Cell 3B  | Ged. van Progr. / Rainb. | 285                                               | 64           | 74            | 61            | 11            | 9       | 504    |
|         | Cell 3C  | Ged. van Ed. / L. draai  | 50                                                | 26           | 16            | 37            | 8             | 45      | 244    |
| Wylk 5  | Cell 4A  | Gedeelte Progress        | 413                                               | 105          | 66            | 67            | 8             | 11      | 670    |
|         | Cell 4B  | Middeldorp               | 76                                                | 40           | 60            | 55            | 45            | 26      | 302    |
| Wylk 6  | Cell 4C  | Woonstelle               | 37                                                | 49           | 31            | 25            | 74            | 31      | 247    |
|         | Cell 5A  | Louisaaleweg             | 609                                               | 96           | 91            | 51            | 2             | 6       | 857    |
| Wylk 7  | Cell 5B  | Landelike gebied         | 34                                                | 10           | 8             | 5             | 10            | 2       | 67     |
|         | Cell 6A  | Ged A van Paballalo      | 261                                               | 79           | 51            | 32            | 11            | 8       | 442    |
| Wylk 8  | Cell 6B  | Ged B van Paballalo      | 444                                               | 83           | 32            | 63            | 15            | 7       | 646    |
|         | Cell 7A  | Dawidskamp               | 168                                               | 58           | 32            | 26            | 7             | 0       | 314    |
| Wylk 9  | Cell 7B  | Ged C van Paballalo      | 664                                               | 129          | 99            | 24            | 6             | 1       | 923    |
|         | Cell 8A  | Ged D van Pab / Nkul.    | 470                                               | 114          | 56            | 47            | 9             | 0       | 696    |
| Wylk 10 | Cell 8B  | Die Rand / Mod.wstelle   | 148                                               | 95           | 121           | 250           | 162           | 175     | 951    |
|         | Cell 9A  | Florepark / Blydeveld    | 135                                               | 41           | 49            | 105           | 101           | 136     | 566    |
| Wylk 11 | Cell 9B  | Oosler. / Ged van Mpos   | 41                                                | 30           | 102           | 134           | 51            | 128     | 406    |
|         | Cell 9C  | Ged. van Grin. & Kmond   | 329                                               | 59           | 30            | 11            | 3             | 0       | 432    |
| Wylk 12 | Cell 10A | Raaswater                | 322                                               | 66           | 27            | 21            | 3             | 0       | 438    |
|         | Cell 10B | Kalssloot                | 305                                               | 22           | 17            | 22            | 0             | 0       | 366    |
| Wylk 13 | Cell 10C | Swartkop                 | 263                                               | 20           | 20            | 4             | 0             | 0       | 307    |
|         | Cell 10D | Louisaale                | 212                                               | 19           | 6             | 6             | 3             | 3       | 249    |
| Wylk 14 | Cell 10E | Landelike gebied         | 132                                               | 28           | 21            | 37            | 66            | 101     | 381    |
|         | Cell 11A | Straussburg              | 84                                                | 27           | 18            | 2             | 1             | 0       | 132    |
| Wylk 15 | Cell 11B | Leenkrans                | 188                                               | 11           | 8             | 2             | 2             | 0       | 211    |
|         | Cell 11C | Karus                    | 234                                               | 17           | 9             | 2             | 0             | 0       | 262    |
| Wylk 16 | Cell 11D | Lambrechtsdriif          | 128                                               | 7            | 9             | 7             | 2             | 0       | 153    |
|         | Cell 11E | Landelike gebied         | 113                                               | 36           | 16            | 27            | 33            | 52      | 276    |
| Wylk 17 | Cell 12A | Kbees / Ged van Mpos     | 35                                                | 24           | 23            | 26            | 209           | 54      | 372    |
|         | Cell 12B | Landelike gebied         | 26                                                | 8            | 7             | 8             | 9             | 9       | 67     |
| TOTAAL  |          |                          | 7988                                              | 1826         | 1410          | 1464          | 856           | 883     | 14807  |

### F 1.3.1.3 Water Affordability

This is described in terms of a percentage of the total monthly household expenditure.

| Ward | Cell | Residential Area     | Expenditure on Water Services | Total Avg Expenditure | Percentage of Total |
|------|------|----------------------|-------------------------------|-----------------------|---------------------|
| 1    | 1A   | Portion. Berge       | 19                            | 1507                  | 1%                  |
|      | 1B   | Koppe                | 34                            | 1286                  | 3%                  |
| 2    | 2A   | Morning Glory        | 19                            | 1404                  | 1%                  |
|      | 2B   | Portion. Rosedale    | 70                            | 1735                  | 4%                  |
|      | 2C   | Jurgens Stadion      | 3                             | 599                   | 0%                  |
| 3    | 3A   | Bellvue              | 121                           | 2153                  | 6%                  |
|      | 3B   | Port. of Progr/Rainb | 9                             | 807                   | 1%                  |
|      | 3C   | Port. Of Ext/L.draai | 146                           | 3260                  | 4%                  |
| 4    | 4A   | Portion of Progress  | 57                            | 1092                  | 5%                  |
|      | 4B   | Middledorp           | 56                            | 2507                  | 2%                  |
|      | 4C   | Flats                | 27                            | 2960                  | 1%                  |
| 5    | 5A   | Louisvaleweg         | 89                            | 1124                  | 8%                  |
|      | 5B   | Rural areas          | 393                           | 4266                  | 9%                  |
| 6    | 6A   | Port A : Paballelo   | 41                            | 973                   | 4%                  |
|      | 6B   | Port B: Paballelo    | 19                            | 913                   | 2%                  |
| 7    | 7A   | Dawidskamp           | 7                             | 699                   | 1%                  |
|      | 7B   | Port C: Paballelo    | 51                            | 1291                  | 4%                  |
| 8    | 8A   | Port D: Pab/Nkulel   | 19                            | 929                   | 2%                  |
|      | 8B   | Die Rand/Mod Flats   | 197                           | 3222                  | 6%                  |
| 9    | 9A   | Florapark/Blydeville | 271                           | 4599                  | 6%                  |
|      | 9B   | Oosterville/Middelpo | 244                           | 4502                  | 5%                  |
|      | 9C   | Port of Grin /K.mond | 74                            | 1009                  | 7%                  |
| 10   | 10A  | Raaswater            | 15                            | 787                   | 2%                  |
|      | 10B  | Kalksloot            | 54                            | 817                   | 7%                  |
|      | 10C  | Swartkop             | 0                             | 576                   | 0%                  |
|      | 10D  | Louisvale            | 11                            | 828                   | 1%                  |
|      | 10E  | Rural areas          | 103                           | 2821                  | 4%                  |
| 11   | 11A  | Ntsikellelo          | 0                             | 706                   | 0%                  |
|      | 11B  | Leerkrans            | 29                            | 799                   | 4%                  |
|      | 11C  | Karos                | 3                             | 697                   | 0%                  |
|      | 11D  | Lambrechtsdrift      | 11                            | 594                   | 2%                  |
|      | 11E  | Rural areas          | 132                           | 3009                  | 4%                  |
| 12   | 12A  | Keidebees/Mid.pos    | 258                           | 3473                  | 7%                  |
|      | 12B  | Rural areas          | 63                            | 2748                  | 2%                  |
|      |      |                      |                               |                       |                     |
|      |      | <b>Average</b>       | <b>78</b>                     | <b>1785</b>           | <b>4%</b>           |

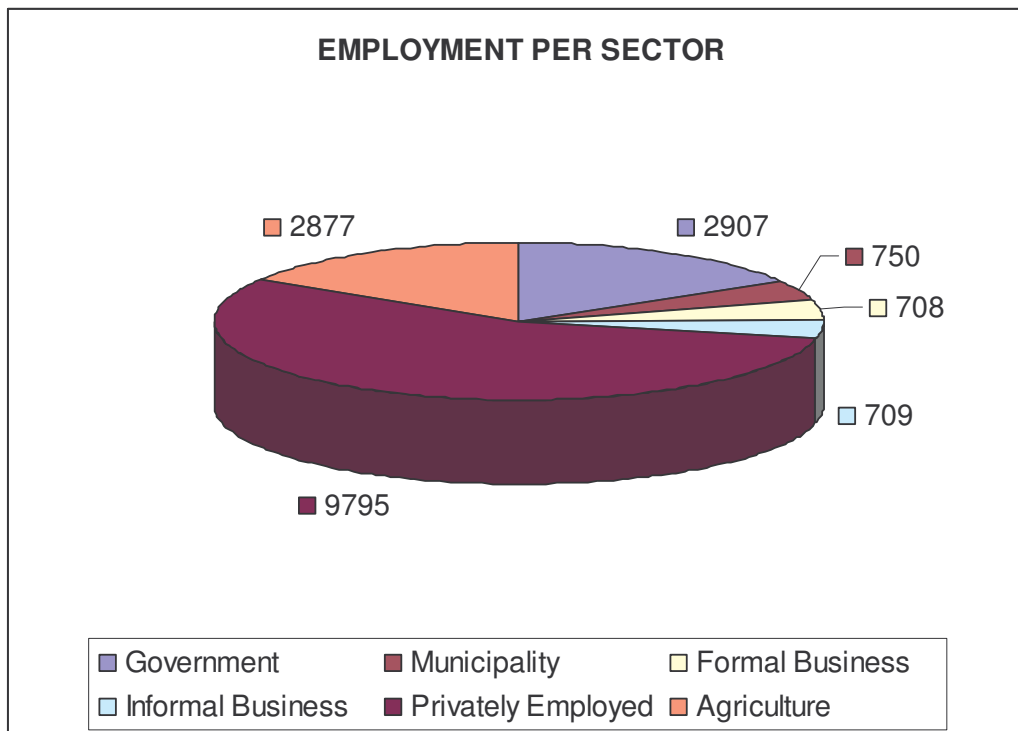
#### F 1.3.1.4 Sanitation Affordability

This is described in terms of a percentage of the total monthly household expenditure.

| Ward | Cell | Residential Area      | Expenditure on Sanitation Services | Total Avg Expenditure | Percentage of Total |
|------|------|-----------------------|------------------------------------|-----------------------|---------------------|
| 1    | 1A   | Portion. Berge        | 9                                  | 1507                  | 1%                  |
|      | 1B   | Koppe                 | 17                                 | 1286                  | 1%                  |
| 2    | 2A   | Morning Glory         | 10                                 | 1404                  | 1%                  |
|      | 2B   | Portion.Rosedale      | 35                                 | 1735                  | 2%                  |
|      | 2C   | Jurgens Stadion       | 1                                  | 599                   | 0%                  |
| 3    | 3A   | Bellvue               | 60                                 | 2153                  | 3%                  |
|      | 3B   | Port.of Progr/Rainb   | 5                                  | 807                   | 1%                  |
|      | 3C   | Port. Of Ext/L.draai  | 73                                 | 3260                  | 2%                  |
| 4    | 4A   | Portion of Progress   | 28                                 | 1092                  | 3%                  |
|      | 4B   | Middedorp             | 28                                 | 2507                  | 1%                  |
|      | 4C   | Flats                 | 14                                 | 2960                  | 0%                  |
| 5    | 5A   | Louisvaleweg          | 45                                 | 1124                  | 4%                  |
|      | 5B   | Rural areas           | 196                                | 4266                  | 5%                  |
| 6    | 6A   | Port A : Paballelo    | 20                                 | 973                   | 2%                  |
|      | 6B   | Port B: Paballelo     | 9                                  | 913                   | 1%                  |
| 7    | 7A   | Dawidskamp            | 4                                  | 699                   | 1%                  |
|      | 7B   | Port C:Paballelo      | 25                                 | 1291                  | 2%                  |
| 8    | 8A   | Port D: Pab/Nkulel    | 9                                  | 929                   | 1%                  |
|      | 8B   | Die Rand/Mod Flats    | 99                                 | 3222                  | 3%                  |
| 9    | 9A   | Florapark/Blydeville  | 136                                | 4599                  | 3%                  |
|      | 9B   | Oosterville/Middelpos | 122                                | 4502                  | 3%                  |
|      | 9C   | Port of Grin /K.mond  | 37                                 | 1009                  | 4%                  |
| 10   | 10A  | Raaswater             | 7                                  | 787                   | 1%                  |
|      | 10B  | Kalksloot             | 27                                 | 817                   | 3%                  |
|      | 10C  | Swartkop              | 0                                  | 576                   | 0%                  |
|      | 10D  | Louisvale             | 5                                  | 828                   | 1%                  |
|      | 10E  | Rural areas           | 51                                 | 2821                  | 2%                  |
| 11   | 11A  | Ntsikellelo           | 0                                  | 706                   | 0%                  |
|      | 11B  | Leerkrans             | 14                                 | 799                   | 2%                  |
|      | 11C  | Karos                 | 1                                  | 697                   | 0%                  |
|      | 11D  | Lambrechtsdrift       | 5                                  | 594                   | 1%                  |
|      | 11E  | Rural areas           | 66                                 | 3009                  | 2%                  |
| 12   | 12A  | Keidebees/Mid.pos     | 129                                | 3473                  | 4%                  |
|      | 12B  | Rural areas           | 31                                 | 2748                  | 1%                  |
|      |      |                       |                                    |                       |                     |
|      |      | <b>Average</b>        | <b>39</b>                          | <b>1785</b>           | <b>2%</b>           |

## F 1.4 Economics

### F 1.4.1.1 Economic Sectors, GGP contribution and employment



#### Total number of employees:

From the //Khara Hais Socio-economic survey (2003) it was found that a total of 17 766 persons were actively employed. This equates to roughly 25% of the total population.

#### Migrating labour:

Migrating labour in the //Khara Hais area is a seasonal occurrence. Typically there are three seasons when there is a large influx of migrating labour. These seasons primarily follow the growth patterns of the grapes which are pruned in June and July, harvest preparation from September to November and then the harvest which takes place from mid-December to March. The total number of migrant workers are in the region of **9300** persons per season.

## F.2 Service Level Profile

### F 2.1 Residential Consumer Units

#### F2.1.1 Situation Assessment

##### F 2.1.1.1 Residential Consumer Units for Water

| No. Consumer units with:                                    | Settlement Type | Rural Village | Rural Scattered | Urban |
|-------------------------------------------------------------|-----------------|---------------|-----------------|-------|
| 1. None or inadequate                                       |                 | 715           | Unknown         |       |
| 2. Communal water supply                                    |                 |               | Unknown         |       |
| 3. Controlled volume supply                                 |                 | 2896          | Unknown         | 615   |
| 4. Uncontrolled volume supply: yard tap or house connection |                 | 3487          | Unknown         | 10743 |
| 5. Total Served (2+3+4)                                     |                 | 6383          | Unknown         | 11358 |
| 6. Total (1+5)                                              |                 | 7098          | Unknown         | 11358 |

##### F 2.1.1.2 Residential Consumer Units for Sanitation

| No. Consumer units with:                                                                                                  | Settlement Type | Rural Village | Rural Scattered | Urban |
|---------------------------------------------------------------------------------------------------------------------------|-----------------|---------------|-----------------|-------|
| 1. None or inadequate: Below RDP: Pit                                                                                     |                 | 456           | Unknown         | 12    |
| 2. None or inadequate: Below RDP: Bucket                                                                                  |                 | 26            | Unknown         | 1143  |
| 3. Consumer installations: On Site dry or equivalent, including VIP toilets, USD, composting system                       |                 | 827           | Unknown         | 954   |
| 4. Consumer installations: Wet (Septic tank, digester or tanker desludge or effluent discharge to an oxidation pond etc.) |                 | 995           | Unknown         |       |
| 5. Discharge to sewer treatment works (intermediate or full waterborne)                                                   |                 |               | Unknown         | 11960 |
| 6. Total Served (3+4+5)                                                                                                   |                 | 1848          | Unknown         | 11960 |
| 7. Total (1+2+6)                                                                                                          |                 | 2330          | Unknown         | 13115 |

##### F2.1.1.3 Grey Water Management

Grey water in the greater Uppington area is discharged to the sewer system for treatment at the wastewater treatment plant.

In the rural villages there is no formal arrangement for grey water management. The older villages such as Raaswater and Kalksloot dispose of their grey water into conservancy tanks which are emptied by a weekly suction tanker service.

The other villages are all equipped with dry sanitation and grey water is typically used for garden watering or disposed of by simply emptying onto the ground.

##### F 2.1.1.4 Pit emptying and Desludging

Pit emptying and desludging of conservancy tanks takes place on a daily basis at villages equipped with conservancy tanks. In Uppington proper, suction tanker services are supplied on demand.

Where dry sanitation units become full, the contents are either removed by suction tankers on demand or small community based projects are launched to empower local small contractors. Typically they will then desludge dry sanitation units by hand for a small fee. Removed sludge is disposed of as solid waste which is removed on a weekly basis from villages. Very little of this has taken place as most villages have only had dry sanitation systems for the last 5 years.

## F 2.2 Public Institutions and “dry” industries

| Public amenities<br>consumer types | Settlement     | No. Of<br>consumer<br>units | No. Of consumer units with access to: |                    |                                |                               |
|------------------------------------|----------------|-----------------------------|---------------------------------------|--------------------|--------------------------------|-------------------------------|
|                                    |                |                             | None or<br>inadequate                 | Communal<br>supply | Controlled<br>volume<br>supply | Uncontrolled<br>volume supply |
| Police Stations                    | Upington       | 3                           |                                       |                    |                                | 3                             |
| Magistrate offices                 | Upington       | 1                           |                                       |                    |                                | 1                             |
| Businesses                         | Upington       | 361                         |                                       |                    |                                | 361                           |
|                                    | Leerkrans      | 1                           |                                       |                    |                                | 1                             |
|                                    | Leseding       | 1                           |                                       |                    |                                | 1                             |
|                                    | Louisvalledorp | 6                           |                                       |                    |                                | 6                             |
|                                    | Raaswater      | 1                           |                                       |                    |                                | 1                             |
|                                    | Kalksloot      | 1                           |                                       |                    |                                | 1                             |
|                                    | Rural (farms)  | 28                          |                                       |                    |                                | 28                            |
| “Dry” Industries                   | Upington       | 176                         |                                       |                    |                                | 176                           |
| Office Buildings                   | Upington       | 361                         |                                       |                    |                                | 361                           |
| Garages                            | Upington       | 11                          |                                       |                    |                                | 11                            |
| Prisons                            | Upington       | 1                           |                                       |                    |                                | 1                             |
| Schools                            | Upington       | 30                          |                                       |                    |                                | 30                            |
| Hospitals                          | Upington       | 2                           |                                       |                    |                                | 2                             |
| Clinics                            | Upington       | 7                           | 2                                     |                    |                                | 5                             |
|                                    | Leerkrans      | 1                           |                                       |                    |                                | 1                             |
|                                    | Karos          | 1                           |                                       |                    |                                | 1                             |
|                                    | Lambrechtsdrif | 1                           |                                       |                    |                                | 1                             |
|                                    | Ntiskellelo    | 1                           |                                       |                    |                                | 1                             |
|                                    | Raaswater      | 1                           |                                       |                    |                                | 1                             |
|                                    | Louisvalledorp | 1                           |                                       |                    |                                | 1                             |
|                                    | Leseding       | 1                           |                                       |                    |                                | 1                             |
|                                    | Wes Rand       | 1                           | 1                                     |                    |                                |                               |
| Crèches                            | Unknown        |                             |                                       |                    |                                |                               |
| Other (Specify)                    |                |                             |                                       |                    |                                |                               |
|                                    |                |                             |                                       |                    |                                |                               |
|                                    |                |                             |                                       |                    |                                |                               |
| <b>Total</b>                       |                | <b>999</b>                  | <b>3</b>                              |                    |                                | <b>996</b>                    |

## F 2.3 Wet Industries

| Settlement | List<br>Individual<br>“wet<br>Industries | Monthly<br>Water<br>use (kl) | Pressure<br>(kPa) | Water Quality |          |             |                  | Reliability<br>(inadequate<br>adequate,<br>special<br>treatment) | Billing<br>system<br>(none flat<br>rate<br>metered) |
|------------|------------------------------------------|------------------------------|-------------------|---------------|----------|-------------|------------------|------------------------------------------------------------------|-----------------------------------------------------|
|            |                                          |                              |                   | Raw           | Filtered | Chlorinated | Fully<br>Treated |                                                                  |                                                     |
| Upington   |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |
|            |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |
|            |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |
|            |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |
|            |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |
|            |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |
|            |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |
|            |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |
|            |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |
| Total      |                                          |                              |                   |               |          |             |                  |                                                                  |                                                     |

No Data Available

## F 2.4 Raw water consumers

| Settlement | 'Raw' Water Consumer  | Monthly Water use (kl) | Pressure (kPa) | Water Quality |          |       | Tariff (R/kl) | Reliability (inadequate adequate, special treatment) | Billing system (none flat rate metered) |
|------------|-----------------------|------------------------|----------------|---------------|----------|-------|---------------|------------------------------------------------------|-----------------------------------------|
|            |                       |                        |                | Raw           | Filtered | Other |               |                                                      |                                         |
| Upington   | GAEB                  | 109                    | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | NCSA                  | 542                    | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Dept Defence          | 6679                   | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Technical School      | 1204                   | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Duineveld School      | 10379                  | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Oranje Noord School   | 3602                   | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Upington High School  | 631                    | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Oranje Boys Hostel    | 90                     | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Upington High School  | 295                    | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Op die Voorpos School | 2839                   | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Fanie Malan School    | 2416                   | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Technical College     | 2973                   | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | VEK Church            | 397                    | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | NG Kerk Blydeville    | 747                    | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | NG Kerk Upt-Wes       | 469                    | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | ACVV                  | 1300                   | <100           | X             |          |       | 1.35          | Adequate                                             | Metered                                 |
|            | Total                 | 35369                  |                |               |          |       |               |                                                      |                                         |

## F 2.5 Industrial consumer units for sanitation : Urban and rural

| Settlement        | Industry | Number of service units | Monthly waste water (kl) | Monthly Sewage (kl) | Washing leaches through storm water system (kl) | Total Treated effluent (kl) | Total Untreated effluent (kl) | Total Return flow to river system (kl) |
|-------------------|----------|-------------------------|--------------------------|---------------------|-------------------------------------------------|-----------------------------|-------------------------------|----------------------------------------|
| No Data Available |          |                         |                          |                     |                                                 |                             |                               |                                        |
| Upington          |          | 152                     | Unknown                  | Unknown             | Unknown                                         |                             |                               |                                        |
| Total             |          |                         |                          |                     |                                                 |                             |                               |                                        |

Industrial effluent is not measured per consumer unit in //Khara Hais. There is however a fair quantity of storm water infiltrating into the sewerage system during rains. It is however difficult to quantify and usually leads to a short sharp peak at the treatment plant when severe rains do occur. The sewage treatment plant is equipped with a flow equalization basin to accommodate such peak flows.

## F 2.6 Industries and their permitted effluent releases

//Khara Hais has no industries which deliver industrial effluent to their treatment plant. There are three major producers of effluent, i.e. :

- Orange River Wine Cellars – treat and dispose of effluent themselves
- KVV - treat and dispose of effluent themselves
- SA Dried Fruit Co-operative - treat and dispose of effluent themselves

The //Khara Hais Municipality does not monitor the above effluents in terms of volume or quality as the Department of Water Affairs and Forestry have direct jurisdiction.

The local abattoirs are required to pre-treat their wash water while all other effluent is disposed of in trenches on the municipal commonage.

### F.3 Water Resource Profile

#### F 3.1.1.1 Surface Water Source ( x 1000 kl)

| Name         | Source Type | Licensed abstraction | Current | Additional Requirement at Year 5 | Record: Prior * |        |        |        |        |
|--------------|-------------|----------------------|---------|----------------------------------|-----------------|--------|--------|--------|--------|
|              |             |                      |         |                                  | -Yr 1           | -Yr 2  | -Yr 3  | -Yr 4  | -Yr 5  |
| Orange River | River       | 25 000               | 14 879  | 0                                | 14 596          | 14 420 | 13 446 | 13 888 | 12 859 |
|              |             |                      |         |                                  |                 |        |        |        |        |
|              |             |                      |         |                                  |                 |        |        |        |        |

#### F 3.1.1.2 Groundwater Source

//Khara Hais Municipality has no groundwater sources that are utilized for water supply.

#### F 3.1.1.3 Groundwater Monitoring

Not applicable

#### F 3.1.1.4 External Sources

Not applicable

#### F 3.1.1.5 Water returned to resources

| Source Name  | Type  | Permitted amount that can be returned (MI/year) | Current (MI/day) | Additional Requirement at | Record: Prior (MI / day) |       |       |       |       |
|--------------|-------|-------------------------------------------------|------------------|---------------------------|--------------------------|-------|-------|-------|-------|
|              |       |                                                 |                  |                           | -Yr 1                    | -Yr 2 | -Yr 3 | -Yr 4 | -Yr 5 |
| Orange River | River | 5 840 000                                       | 12.52            | 0                         | 11.00                    | 11.45 | 10.86 | 11.85 | 11.45 |
|              |       |                                                 |                  |                           |                          |       |       |       |       |
|              |       |                                                 |                  |                           |                          |       |       |       |       |

### F 3.2 Water Quality

#### F 3.2.1.1 Quality of Water taken from source : urban

|                                                                                    | Yes / No  | At Source | At Reservoir | At tap    |
|------------------------------------------------------------------------------------|-----------|-----------|--------------|-----------|
| Is water quality measured? (Yes/no)                                                | Yes       | Yes       | Yes          | Yes       |
| 1. Do you monitor it yourself? (Yes/no)                                            | Yes       | Yes       | Yes          | Yes       |
| 2. If no, who does?                                                                |           |           |              |           |
| 3. Monitoring intervals (daily, weekly, monthly, quarterly, bi-annually, annually) | 2 monthly | 2 monthly | 2 monthly    | 2 monthly |
| 4. Are these results available in electronic format? (Yes/no)                      |           | No        | No           | No        |
| 5. % Time (days) within SABS 241 standards per year                                |           | 0%        | 99%          | 99%       |

#### F 3.2.1.2 Quality of water taken from source: rural

|                                                                                    | Yes / No  | At Source | At Reservoir | At tap    |
|------------------------------------------------------------------------------------|-----------|-----------|--------------|-----------|
| 1. Is water quality measured? (Yes/no)                                             | Yes       | Yes       | Yes          | Yes       |
| 2. Do you monitor it yourself? (Yes/no)                                            | Yes       | Yes       | Yes          | Yes       |
| 3. If no, who does?                                                                | AL Abbott |           |              |           |
| 4. Monitoring intervals (daily, weekly, monthly, quarterly, bi-annually, annually) | 2 monthly | 2 monthly | 2 monthly    | 2 monthly |
| 5. Are these results available in electronic format? (Yes/no)                      |           | No        | No           | No        |
| 6. % Time (days) within SABS 241 standards per year                                |           | 0%        | 97%          | 97%       |

### F 3.2.1.3 Reporting on quality of water taken from source: urban and rural

|                                                                                      | Yes/No     | Method of notification                            |
|--------------------------------------------------------------------------------------|------------|---------------------------------------------------|
| If quality of water taken from source does not comply, are urban residents notified? | <b>Yes</b> | <b>Flyers, local radio , municipal newsletter</b> |
| If quality of water taken from source does not comply, are rural residents notified? | <b>Yes</b> | <b>Flyers, local radio</b>                        |

#### Resources Available to perform function:

The //Khara Hais Municipality has trained operators at the Abraham Holbors September water treatment plant in Upington who take samples every 4 hours to analyze basic parameters such as pH, turbidity, free chlorine levels, etc. These results are logged and used primarily for decision making purposes in terms of chemical dosing adjustment. These basic parameters are analyzed on a 24 hour basis.

The operators at the smaller plants do similar analyses as above, but only for 12 hours per day.

In addition to the above, the firm AL Abbott & Associates is employed by the council to do a full analysis of the raw and potable water at all treatment plants on a 2 monthly basis. These 2 monthly analyses include a full chemical analysis as well as a microbiological analysis. These analysis results are then benchmarked against the SANS 241: 2005 standard for domestic water quality.

The municipal water treatment function is managed by the Control Technician: Water Care who is an able and experienced person. Continuous microbiological analysis is also done at various sampling points on the distribution network by the municipal Environmental Health Officer on a monthly basis.

There is sufficient funding on the budget available for this function

### F 3.2.1.4 Quality of water returned to the resource : urban

|                                                                                                                                              | Yes / No          | In the return effluent | In the Storm water | In the River |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------|--------------------|--------------|
| 1. Is water quality measured? (Yes/no)                                                                                                       | <b>Yes</b>        | <b>Yes</b>             | <b>No</b>          | <b>No</b>    |
| 2. Do you monitor it yourself? (Yes/no)                                                                                                      | <b>Yes</b>        | <b>Yes</b>             |                    |              |
| 3. If no, who does?                                                                                                                          | <b>AL Abbott</b>  |                        |                    |              |
| 4. Monitoring intervals (weekly, monthly, quarterly, bi-annually, annually)                                                                  | <b>Bi-monthly</b> | <b>Bi-monthly</b>      |                    |              |
| 5. Are these results available in electronic format?                                                                                         | <b>No</b>         | <b>No</b>              | <b>No</b>          | <b>No</b>    |
| 6. For wastewater treatment works discharges to water resource: % time within requirements of special or general standards (Regulation 991). |                   | <b>98%</b>             |                    |              |

### F 3.2.1.5 Quality of water returned to the resource : rural

The //Khara Hais Municipality has no rural treatment schemes. All rural sanitation is dry by nature with the exception of Louisvleweg which is equipped with oxidation ponds. The oxidation pond effluent is irrigated on bare land and no effluent is returned to the resource.

## F.4 Water Conservation and Demand Management

### F.4.1 Water resource management interventions

#### F.4.1.1 Targets for reducing unaccounted for water and inefficiencies :urban

|                         | Prior 1 | Current | Year 1  | Year 2  | Year 3  | Year 4  | Year 5  |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|
| Reticulation leaks      | 616     | 494     | 444     | 400     | 360     | 324     | 292     |
| Illegal connections     | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Unmetered connections   | Unknown | 679     | 543     | 435     | 348     | 278     | 223     |
| Internal plumbing leaks | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Total UAW               |         |         |         |         |         |         |         |

#### F.4.1.1.3 Reducing high pressures for residential consumers : urban

|                                                     | Prior 1 | Current           | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|-----------------------------------------------------|---------|-------------------|--------|--------|--------|--------|--------|
| 1. Number of consumer units with pressure > 600kPa  | 0       | 0                 | 0      | 0      | 0      | 0      | 0      |
| 2. Number of consumer units with pressures > 900kPa | 0       | No Data Available |        |        |        | 0      | 0      |

#### F.4.1.1.4 Reducing high pressures for residential consumers : rural

|                                                     | Prior 1 | Current | Year 1            | Year 2 | Year 3 | Year 4 | Year 5 |
|-----------------------------------------------------|---------|---------|-------------------|--------|--------|--------|--------|
| 3. Number of consumer units with pressure > 600kPa  | 0       | 0       | 0                 | 0      | 0      | 0      | 0      |
| 4. Number of consumer units with pressures > 900kPa | 0       | 0       | No Data Available |        |        | 0      | 0      |

There are very few points in both the Uppington and rural villages where the water pressure is higher than 4.8bar. This is due to the largely flat topography of the supply area. There are therefore currently no pressure control systems in place to reduce pressure and thereby leakage during periods of low demand.

#### Pipeline management and rehabilitation:

The Uppington water distribution network has been modeled and calibrated on WADISO water network analysis software. This tool is used by a qualified technician to analyze any additional requirements in terms of point specific demands that may arise. A demand can be simulated and the analysis software then makes recommendations as to which pipelines are to be increased in size and also where critically low pressures may arise due to the planned demand increase. The municipality has a full time water network maintenance team that also works on a standby basis for possible after hours breakages or pipe failures. The //Khara Hais municipality has since 1998 placed funds on the budget for the rehabilitation of problem pipelines. This is an ongoing programme whereby the network is continuously upgraded. It has become necessary due to the age of the network in several areas being in excess of 30 years.

#### **Repairs to plumbing leaks:**

Although no formal records exist, the municipality has embarked on a programme of repairing internal plumbing leaks at private households. This basically entails the repair of visible leaks as well as basic maintenance of leaking toilet cisterns. This work is given to small BBBEE contractors as a method of empowering the contractors but also controlling unnecessary leakage.

#### **Prepaid metering:**

The //Khara Hais municipality has since 2002 embarked on a program of installing prepaid water meters. The reason for this being that several villages inherited after demarcation had no metering in at all and in addition policies such as the supply of free basic water made the control of volume supplied to households imperative.

A decision was taken that prepaid metering be installed at indigent households first to ensure that each indigent household gets its allocated 10 kiloliters per month. Meters are programmed in such a manner to facilitate the delivery of 333 liters per household per day. This program has lead to huge savings on especially bulk supply infrastructure which previously battled to maintain sufficient supply.

By this method, poor families receive their free basic water and volume of use is controlled effectively. Households with prepaid metering do not receive an account and thereby generates a substantial saving on administrative costs.

This program also utilizes small BBBEE contractors for the installation of these meters on an ongoing basis.

#### **F 4.1.1.5 Consumer/end-use demand management : public information and education**

There are currently no formal programs being implemented.

#### **F 4.1.1.6 Leak and meter repair programmes ; urban**

| Number of consumer units to be targeted by: | Prior 1 | Current | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---------------------------------------------|---------|---------|--------|--------|--------|--------|--------|
| 1. Meter repair programme                   | 897     | 780     | 819    | 860    | 903    | 948    | 995    |

The reading of water meters is contracted out to a service provider. A part of the service is to record the number and location of all faulty meters on a monthly basis. Said record is then taken by the water network maintenance team who embarks on a continuous program of either repairing or replacing faulty meters.

#### **F 4.1.1.7 Leak and meter repair programmes: rural**

A similar program is employed in the rural villages.

## F.5 Water Services Infrastructure Profile

### F 5.1.1.1 Existing Infrastructure

#### F 5.1.1.2 Brief functional description of existing main infrastructure components

| Component                                                             | Description of the main functional tasks                                                                                                                                                                                                                                                          | Responsibility                       |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Upington:</b>                                                      |                                                                                                                                                                                                                                                                                                   |                                      |
| Raw Water Pump Station                                                | Concrete abstraction tower in river<br>3 x ABS immersible Pumps : 1500 l/s at 25m head                                                                                                                                                                                                            | //Khara Hais Mun                     |
| Raw Water Irrigation Pump Station                                     | 3 x 75kW Centrifugal Pumps : 40 l/s at 160m head                                                                                                                                                                                                                                                  | //Khara Hais Mun                     |
| Water Treatment Plant                                                 | Conventional process with pre-sedimentation facility<br>4 x Settling Tanks<br>Lime dosing capability<br>Chemical dosing of primary and secondary coagulant<br>Disinfection with chlorine gas<br>17 x Rapid gravity sand filters<br>Design Capacity : 64 ml per day<br>Electronic flow measurement | //Khara Hais Mun                     |
| Clear Water Pump Station                                              | 4 x 200kW Centrifugal Pumps:890 l/s capacity at 40m                                                                                                                                                                                                                                               | //Khara Hais Mun                     |
| Keidebees Reservoir                                                   | Square lined earth fill embankment with floating roof<br>Capacity: 45 MI                                                                                                                                                                                                                          | //Khara Hais Mun                     |
| Keidebees Booster Pump Station                                        | 2 x 75kW Centrifugal Pumps :340 l/s at 25m head                                                                                                                                                                                                                                                   | //Khara Hais Mun                     |
| Keidebees Water Tower                                                 | Circular Concrete elevated reservoir<br>Capacity : 1.5 MI                                                                                                                                                                                                                                         | //Khara Hais Mun                     |
| Updustria Dome Reservoir                                              | Circular concrete reservoir with domed roof<br>Capacity : 30 MI                                                                                                                                                                                                                                   | //Khara Hais Mun                     |
| Paballelo Booster Pump Station                                        | 2 x 75kW Centrifugal Pumps :340 l/s at 25m head                                                                                                                                                                                                                                                   | //Khara Hais Mun                     |
| Paballelo Water Tower                                                 | Circular Concrete elevated reservoir<br>Capacity : 800 kl                                                                                                                                                                                                                                         | //Khara Hais Mun                     |
| Kalahari West Booster Pump Station                                    | 4 x 55kW Multistage centrifugal pumps: 32l/s at 175m                                                                                                                                                                                                                                              | //Khara Hais Mun                     |
| Nakop Booster Pump Station                                            | 2x7.5kW Multistage centrifugal pumps: 1.5l/s at 135m                                                                                                                                                                                                                                              | //Khara Hais Mun                     |
| Hotel Raw Water Pump Station                                          | 1 x 75kW dual stage centrifugal pump: 90l/s at 55m                                                                                                                                                                                                                                                | //Khara Hais Mun                     |
| Eiland Irrigation Pump Station                                        | 1 x 15kW centrifugal pump :30 l/s at 30m                                                                                                                                                                                                                                                          | //Khara Hais Mun                     |
| Unievelde Treated Effluent Pump Station                               | 2 x 15kW centrifugal pumps: 30l/s at 35m                                                                                                                                                                                                                                                          | //Khara Hais Mun                     |
| Airport Booster Pump Station                                          | 1 x 32kW centrifugal pump : 70 l/s at 62m                                                                                                                                                                                                                                                         | //Khara Hais Mun                     |
| <b>Reticulation Network:</b>                                          |                                                                                                                                                                                                                                                                                                   |                                      |
| Keidebees Rising Main                                                 | 600mm dia AC pipe 4 200m in length                                                                                                                                                                                                                                                                | //Khara Hais Mun                     |
| Central Reservoir Rising Main                                         | 400mm dia AC pipe 3 600m in length                                                                                                                                                                                                                                                                | //Khara Hais Mun                     |
| Updustria Rising Main                                                 | 700mm dia AC pipe 7 000m in length                                                                                                                                                                                                                                                                | //Khara Hais Mun                     |
| <b>Private Reservoirs:</b>                                            |                                                                                                                                                                                                                                                                                                   |                                      |
| Dept of Agriculture<br>Dept of Water Affairs and Forestry<br>Spoornet | Concrete Elevated Reservoir : capacity 80 kl<br>Concrete elevated reservoir : capacity 59kl<br>3 x Sectional Steel Elevated Tanks: capacity 240kl                                                                                                                                                 | Dept Agriculture<br>DWAF<br>Spoornet |

| Component                                                                                                                                                                                                                        | Description of the main functional tasks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Responsibility                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Lambrechtsdrift:</b><br>Raw Water Pump Station<br><br>Raw Water Reservoir<br><br>Package Type Treatment Plant<br><br><br>Clear Water Elevated Reservoir<br><br><b>Reticulation Network:</b><br>Trunk Main:                    | 1 x 15kW centrifugal pump : 15l/s at 25m abstracting from Boegoeberg irrigation canal<br><br>Earthfill reservoir concrete lined : capacity 3750 kl<br><br>12m <sup>3</sup> /h Capacity<br>2 x 6m <sup>3</sup> /h settling tanks<br>1 x 12m <sup>3</sup> /h pressure filter<br>Single coagulant dosing<br>Disinfection with HTH Solution<br>Electronic flow measurement<br><br>Elevated Sectional Steel Tank : Capacity :120 kl<br><br>110mm dia PVC : Length unknown                                                                               | //Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun |
| <b>Leerkrans:</b><br>Raw Water Pump Station<br><br>Raw Water Reservoir<br><br>Package Type Treatment Plant<br><br><br>Clear Water Reservoir<br>Clear Water Elevated Reservoir<br><br><b>Reticulation Network:</b><br>Trunk Main: | 1 x 1.1kW centrifugal pump : 15l/s at 25m abstracting from Boegoeberg irrigation canal<br><br>Earthfill reservoir concrete lined : capacity 4 500 kl<br><br>12m <sup>3</sup> /h Capacity<br>2 x 6m <sup>3</sup> /h settling tanks<br>2 x 6m <sup>3</sup> /h pressure filter<br>Single coagulant dosing<br>Disinfection with HTH Solution<br>Booster Pump<br>Electronic Flow measurement<br><br>Sectional Steel Tank on dwarf walls: Capacity: 220 kl<br><br>Elevated Sectional Steel Tank : Capacity : 85 kl<br><br>110mm dia PVC : Length unknown | //Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun |
| <b>Karos:</b><br>Raw Water Pump Station<br><br>Raw Water Reservoir<br><br>Package Type Treatment Plant<br><br><br>Clear Water Reservoir<br>Clear Water Elevated Reservoir<br><br><b>Reticulation Network:</b><br>Trunk Main:     | 1 x 15kW centrifugal pump : 15l/s at 25m abstracting from Boegoeberg irrigation canal<br><br>Earthfill reservoir concrete lined : capacity 4 500 kl<br><br>12m <sup>3</sup> /h Capacity<br>2 x 6m <sup>3</sup> /h settling tanks<br>1 x 12m <sup>3</sup> /h pressure filter<br>Single coagulant dosing<br>Disinfection with HTH Solution<br>Electronic Flow measurement<br><br>Sectional Steel Tank on dwarf walls: Capacity: 300 kl<br><br>Elevated Sectional Steel Tank : Capacity :130 kl<br><br>110mm dia PVC : Length unknown                 | //Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun                         |

| Component                                                                                                                                                                                                      | Description of the main functional tasks                                                                                                                                                                                                                                                                                                                                                                                         | Responsibility                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>Ntsikellelo;</b><br><br>Raw Water supply:<br><br>Raw Water Reservoir<br><br>Package Type Treatment Plant<br><br><br>Clear Water Elevated Reservoir<br><br><b>Reticulation Network:</b><br><br>Trunk Main:   | Pressurized take-off from private irrigation pipeline<br><br>Earthfill reservoir concrete lined : capacity 2 000 kl<br><br>12m <sup>3</sup> /h Capacity<br>2 x 6m <sup>3</sup> /h settling tanks<br>2 x 6m <sup>3</sup> /h pressure filter<br>Single coagulant dosing<br>Disinfection with HTH Solution<br>Electronic Flow measurement<br><br>Elevated Sectional Steel Tank : Capacity :200 kl<br><br>Unknown                    | //Khara Hais Mun<br><br>//Khara Hais Mun<br><br><br><br><br>//Khara Hais Mun |
| <b>Leseding:</b><br><br>Raw Water Pump Station<br><br>Raw Water Reservoir<br><br>Package Type Treatment Plant<br><br><br>Clear Water Elevated Reservoir<br><br><b>Reticulation Network:</b><br><br>Trunk Main: | Sliding ramp mounted centrifugal pump: 3l/s at 38m<br><br>9.5m dia. galvanized sheet dam : capacity :130kl<br><br>12m <sup>3</sup> /h Capacity<br>2 x 6m <sup>3</sup> /h settling tanks<br>2 x 6m <sup>3</sup> /h pressure filter<br>Single coagulant dosing<br>Disinfection with HTH Solution<br>Electronic Flow measurement<br><br>Elevated Sectional Steel Tank : Capacity :200 kl<br><br>140mm dia PVC pipe : Length unknown |                                                                              |
| <b>Louisvaledorp:</b><br><br>Raw Water Pump Station<br><br>Package Type Treatment Plant<br><br><br>Clear Water Elevated Reservoir<br><br><b>Reticulation Network:</b><br><br>Trunk Main:                       | 1 x 1.1kW centrifugal pump abstracting from a sump adjacent to Upington Islands irrigation canal<br><br>12m <sup>3</sup> /h Capacity<br>2 x 6m <sup>3</sup> /h settling tanks<br>2 x 6m <sup>3</sup> /h pressure filter<br>Single coagulant dosing<br>Disinfection with HTH Solution<br>Electronic Flow measurement<br><br>Elevated Sectional Steel Tank : Capacity :200 kl<br><br>140mm dia PVC pipe : Length unknown           | //Khara Hais Mun<br><br>//Khara Hais Mun<br><br><br>//Khara Hais Mun         |

| Component                                                                                                                                                                                                                               | Description of the main functional tasks                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Responsibility                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Raaswater:</b><br>Raw Water Pump Station<br>Raw Water Reservoir<br>Package Type Treatment Plant<br><br>Clear Water Reservoir<br>Clear Water Reservoir<br><br><b>Reticulation Network:</b><br>Trunk Main:                             | 1 x 45kW centrifugal pump on a floating raft abstracting water from the Orange River<br><br>9.5m dia. galvanized sheet dam : capacity :130kl<br><br>20m <sup>3</sup> /h Capacity<br>4 x 6m <sup>3</sup> /h settling tanks<br>4 x 6m <sup>3</sup> /h pressure filter<br>Single coagulant dosing<br>Disinfection with HTH Solution<br>Booster pump station<br>Electronic Flow measurement<br><br>Circular concrete reservoir : capacity : 680 kl<br><br>Sectional Steel Tank on stub columns : 650 kl | //Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun<br><br><br>//Khara Hais Mun<br><br>//Khara Hais Mun |
| <b>Kalksloot:</b><br>Clear Water Pipeline<br><br>Clear Water Booster Pump Station<br><br>Clear Water Reservoir<br>Clear Water Booster Pump Station<br>Clear Water Elevated Reservoir<br><br><b>Reticulation Network:</b><br>Trunk Main: | 200mm dia x 5.3km AC gravity main pipeline<br>150mm dia x 5.0km AC rising main pipeline<br><br>2x15kW centrifugal pumps<br>Capacity:14l/s at 57m head<br><br>Circular concrete reservoir : capacity : 425 kl<br><br>1 x 4kW centrifugal pump : 18 l/s at 12.5m head<br><br>Elevated Sectional Steel Tank : Capacity :102 kl                                                                                                                                                                         | //Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun<br><br>//Khara Hais Mun     |

#### F 5.1.1.3 Existing Groundwater Infrastructure

The //Khara Hais Municipality does not make use of any groundwater infrastructure for the purpose of water supply.

#### F 5.1.1.4 Existing Surface Water Infrastructure

The //Khara Hais Municipality does not have any formal surface water infrastructure such as dams, etc. All water is abstracted directly from the Orange River main stream by means of an abstraction tower in the stream.

The water from rural villages is either abstracted from a nearby irrigation canal or in the case of Raaswater and Leseding directly from the Orange River with a pump arrangement.

### F 5.1.1.5 Existing Water Treatment Works Infrastructure

| General information                                                            |  | WTW1                                                         | WTW2                                                         | WTW3                                                         | WTW4                                                         | WTW5                                                         | WTW6                                                         | WTW7                                                         | WTW8                                                         |
|--------------------------------------------------------------------------------|--|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|
| Component name                                                                 |  | Abraham Holboers September Treatment Works                   | Lambrechtsdrift Water Treatment Works                        | Karos Water Treatment Works                                  | Leerkrans Water Treatment Works                              | Ntsikellelo Water Treatment Works                            | Leseding Water Treatment Works                               | Louisvale Water Treatment Works                              | Raaswater Water Treatment Works                              |
| Component ID                                                                   |  |                                                              |                                                              |                                                              |                                                              |                                                              |                                                              |                                                              |                                                              |
| Scheme name                                                                    |  | Upington                                                     | Lambrechtsdrift                                              | Karos                                                        | Leerkrans                                                    | Ntsikellelo                                                  | Leseding                                                     | Louisvale Water Treatment Works                              | Raaswater                                                    |
| <b>Operation</b>                                                               |  |                                                              |                                                              |                                                              |                                                              |                                                              |                                                              |                                                              |                                                              |
| Total volume of water treated per year (Ml)                                    |  | 13305.37                                                     | 17.083                                                       | 23.207                                                       | 32.916                                                       | <b>Not operational yet</b>                                   | 56.414                                                       | 26.173                                                       |                                                              |
| Operating hours per day                                                        |  | 24 hours                                                     | 18 hours                                                     | 18 hours                                                     | 18 hours                                                     | 18 hours                                                     | 18 hours                                                     | 18 hours                                                     | 24 hours                                                     |
| How often is water quality monitored? (daily, weekly, monthly, annual, never)  |  | Critical parameters monitored daily. Full analysis 2 monthly | Critical parameters monitored daily. Full analysis 2 monthly | Critical parameters monitored daily. Full analysis 2 monthly | Critical parameters monitored daily. Full analysis 2 monthly | Critical parameters monitored daily. Full analysis 2 monthly | Critical parameters monitored daily. Full analysis 2 monthly | Critical parameters monitored daily. Full analysis 2 monthly | Critical parameters monitored daily. Full analysis 2 monthly |
| What laboratory is used?                                                       |  | AL Abbott & Assoc.                                           | AL Abbott & Assoc.                                           | AL Abbott & Assoc.                                           | AL Abbott & Assoc.                                           | AL Abbott & Assoc.                                           | AL Abbott & Assoc.                                           | AL Abbott & Assoc.                                           | AL Abbott & Assoc.                                           |
| % Of the time that water is chlorinated                                        |  | 100%                                                         | 100%                                                         | 100%                                                         | 100%                                                         | 100%                                                         | 100%                                                         | 100%                                                         | 100%                                                         |
| % Of water lost through process (eg. Waste water)                              |  | <5%                                                          | <5%                                                          | <5%                                                          | <5%                                                          | <5%                                                          | <5%                                                          | <5%                                                          | <5%                                                          |
| Is abstraction recorded? (Yes/No)                                              |  | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          |
| Is the abstraction registered with DWAF? (Yes/No)                              |  | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          | Yes                                                          |
| Previous vandalism or theft (Security Problem) (Yes/No)                        |  | No                                                           | No                                                           | No                                                           | No                                                           | No                                                           | No                                                           | No                                                           | No                                                           |
| <b>Functionality</b>                                                           |  |                                                              |                                                              |                                                              |                                                              |                                                              |                                                              |                                                              |                                                              |
| Describe the physical condition (in operation, poor, good)                     |  | Good                                                         | Good                                                         | Good                                                         | Good                                                         | Good                                                         | Good                                                         | Good                                                         | Good                                                         |
| How well is the infrastructure maintained? (None, infrequent, demand, planned) |  | Planned Maintenance on a Weekly basis                        | Planned Maintenance on a Weekly basis                        | Planned Maintenance on a Weekly basis                        | Planned Maintenance on a Weekly basis                        | Planned Maintenance on a Weekly basis                        | Planned Maintenance on a Weekly basis                        | Planned Maintenance on a Weekly basis                        | Planned Maintenance on a Weekly basis                        |
| Are spare parts readily available? (Yes/No)                                    |  | Yes, critical parts are available                            | Yes, critical parts are available                            | Yes, critical parts are available                            | Yes, critical parts are available                            | Yes, critical parts are available                            | Yes, critical parts are available                            | Yes, critical parts are available                            | Yes, critical parts are available                            |
| Number of breakages / failures per year                                        |  | <3                                                           | <3                                                           | <3                                                           | <3                                                           | <3                                                           | <3                                                           | <3                                                           | <3                                                           |
| What needs to be refurbished? (Cost)                                           |  | Nil, plants are in good condition                            | Nil, plants are in good condition                            | Nil, plants are in good condition                            | Nil, plants are in good condition                            | Nil, plants are in good condition                            | Nil, plants are in good condition                            | Nil, plants are in good condition                            | Nil, plants are in good condition                            |

| General information                                       | WTW1                                      | WTW2                                  | WTW3                        | WTW4                            | WTW5                              | WTW6                           | WTW7                            | WTW8                            |
|-----------------------------------------------------------|-------------------------------------------|---------------------------------------|-----------------------------|---------------------------------|-----------------------------------|--------------------------------|---------------------------------|---------------------------------|
| Component name                                            | Abraham Holbors September Treatment Works | Lambrechtsdrift Water Treatment Works | Karos Water Treatment Works | Leerkrans Water Treatment Works | Ntsikellelo Water Treatment Works | Leseding Water Treatment Works | Louisvale Water Treatment Works | Raaswater Water Treatment Works |
| What needs to be replaced? (Cost)                         | Choronation system R250 000 - 00          | Nothing                               | Nothing                     | Nothing                         | Nothing                           | Nothing                        | Nothing                         | Nothing                         |
| <b>Institutional status</b>                               |                                           |                                       |                             |                                 |                                   |                                |                                 |                                 |
| Current owner                                             | //Khara Hais Mun                          | //Khara Hais Mun                      | //Khara Hais Mun            | //Khara Hais Mun                | //Khara Hais Mun                  | //Khara Hais Mun               | //Khara Hais Mun                | //Khara Hais Mun                |
| Current operator                                          | //Khara Hais Mun                          | //Khara Hais Mun                      | //Khara Hais Mun            | //Khara Hais Mun                | //Khara Hais Mun                  | //Khara Hais Mun               | //Khara Hais Mun                | //Khara Hais Mun                |
| Future owner / WSA (if applicable)                        | N/A                                       | N/A                                   | N/A                         | N/A                             | N/A                               | N/A                            | N/A                             | N/A                             |
| Future operator / WSP (if applicable)                     | N/A                                       | N/A                                   | N/A                         | N/A                             | N/A                               | N/A                            | N/A                             | N/A                             |
| <b>General information</b>                                |                                           |                                       |                             |                                 |                                   |                                |                                 |                                 |
| <b>Asset assessment</b>                                   |                                           |                                       |                             |                                 |                                   |                                |                                 |                                 |
| Date constructed                                          | 1956                                      | 2001                                  | 2004                        | 2004                            | 2006                              | 2005                           | 2003                            | 1994                            |
| Expected total lifespan                                   | 30 years                                  | 20 years                              | 20 years                    | 20 years                        | 20 years                          | 20 years                       | 20 years                        | 2 years – needs to be upgraded  |
| Estimated replacement value                               | R91 959 960-00                            | R484 000-00                           | R484 000-00                 | R484 000-00                     | R484 000-00                       | R484 000-00                    | R484 000-00                     | R630 000-00                     |
| Annual operating cost                                     |                                           |                                       |                             |                                 |                                   |                                |                                 |                                 |
| Annual maintenance cost                                   |                                           |                                       |                             |                                 |                                   |                                |                                 |                                 |
| <b>Type &amp; capacity</b>                                |                                           |                                       |                             |                                 |                                   |                                |                                 |                                 |
| Type of plant (description)                               | Conventional                              | Package                               | Package                     | Package                         | Package                           | Package                        | Package                         | Package                         |
| Water source (purchased, ground, surface)                 | Surface (Orange River)                    | Surface (Boegoeborg canal)            | Surface (Boegoeborg canal)  | Surface (Boegoeborg canal)      | Purchased (private pipeline)      | Surface (Orange River)         | Surface (Upington Canal)        | Surface (Orange River)          |
| Physical water quality: Turbidity                         | 50 – 500 NTU                              | 50 – 500 NTU                          | 50 – 500 NTU                | 50 – 500 NTU                    | 50 – 500 NTU                      | 50 – 500 NTU                   | 50 – 500 NTU                    | 50 – 500 NTU                    |
| Chemical causing quality problem (> 10 mg/l)              | Seasonal algae outbreaks                  | Seasonal algae outbreaks              | Seasonal algae outbreaks    | Seasonal algae outbreaks        | Seasonal algae outbreaks          | Seasonal algae outbreaks       | Seasonal algae outbreaks        | Seasonal algae outbreaks        |
| Design Capacity (MI)                                      | 64                                        | 12 m <sup>3</sup> /h                  | 12 m <sup>3</sup> /h        | 12 m <sup>3</sup> /h            | 12 m <sup>3</sup> /h              | 12 m <sup>3</sup> /h           | 12 m <sup>3</sup> /h            | 20 m <sup>3</sup> /h            |
| How much capacity is still available for development? (%) | 22%                                       | 42%                                   | 39%                         | 34%                             | Unknown                           | 23%                            | 38%                             | 23% (needs to be upgraded)      |

It is not possible to quantify the operating costs and maintenance costs separately as the municipal financial system does not distinguish between the different treatment plants.

### F 5.1.1.6 Existing pump station infrastructure

| General information                                                            | PS1                   | PS2                   | PS3                       | PS4               | PS5                 | PS6                   | PS7                        | PS8               | PS9                 | PS10                   | PS11                  |
|--------------------------------------------------------------------------------|-----------------------|-----------------------|---------------------------|-------------------|---------------------|-----------------------|----------------------------|-------------------|---------------------|------------------------|-----------------------|
| Component name                                                                 | Keidebees Booster P/S | Pabellelo Booster P/S | Kalahari-West Booster P/S | Nakop Booster P/S | Hotel Raw Water P/S | Eiland Irrigation P/S | Unievelde Treated Effluent | 8 SAI Booster P/S | Airport Booster P/S | Proefplaas Booster P/S | Kalksloot Booster P/S |
| Component ID                                                                   |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |
| Scheme name                                                                    | Upington              | Upington              | Upington                  | Upington          | Upington            | Upington              | Upington                   | Upington          | Upington            | Upington               | Upington              |
| <b>Operation</b>                                                               |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |
| Operating hours per day                                                        | 24h                   | 24h                   | 24h                       | 20h               | 12h                 | 8h                    | 8h                         | 24h               | 24h                 | 24h                    | 24h                   |
| Are there any standby pumps available (Yes/No)                                 | Yes                   | Yes                   | Yes                       | Yes               | Yes                 | No                    | Yes                        | No                | Yes                 | Yes                    | Yes                   |
| <b>Functionality</b>                                                           |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |
| Describe the physical condition (in operation, poor, good)                     | Good                  | Good                  | In operation              | Good              | In operation        | In operation          | Good                       | In operation      | Good                | In operation           | Good                  |
| How well is the infrastructure maintained? (None, infrequent, demand, planned) | Planned               | Planned               | Planned                   | Planned           | Planned             | Planned               | Planned                    | Planned           | Planned             | Planned                | Planned               |
| Are spare parts readily available? (Yes/No)                                    | Yes                   | Yes                   | Yes                       | Yes               | Yes                 | Yes                   | Yes                        | Yes               | Yes                 | Yes                    | Yes                   |
| Number of breakages / failures per year                                        |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |
| What needs to be refurbished? (Cost)                                           |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |
| What needs to be replaced? (Cost)                                              |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |
| <b>Institutional status</b>                                                    |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |
| Current owner                                                                  | //Khara Hais          | //Khara Hais          | //Khara Hais              | //Khara Hais      | //Khara Hais        | //Khara Hais          | //Khara Hais               | //Khara Hais      | //Khara Hais        | //Khara Hais           | //Khara Hais          |
| Current operator                                                               | //Khara Hais          | //Khara Hais          | //Khara Hais              | //Khara Hais      | //Khara Hais        | //Khara Hais          | //Khara Hais               | //Khara Hais      | //Khara Hais        | //Khara Hais           | //Khara Hais          |
| Future owner / WSA (if applicable)                                             | N/A                   | N/A                   | N/A                       | N/A               | N/A                 | N/A                   | N/A                        | N/A               | N/A                 | N/A                    | N/A                   |
| Future operator / WSP (if applicable)                                          | N/A                   | N/A                   | N/A                       | N/A               | N/A                 | N/A                   | N/A                        | N/A               | N/A                 | N/A                    | N/A                   |
| <b>Asset assessment</b>                                                        |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |
| Date constructed                                                               | 1984                  | 1992                  | 1988                      | 2006              | UNKNOWN             | UNKNOWN               | 1998                       | UNKNOWN           | UNKNOWN             | UNKNOWN                | 1977                  |
| Expected total lifespan                                                        | 25 Years              | 25 Years              | 25 Years                  | 25 Years          | 25 Years            | 25 Years              | 25 Years                   | 25 Years          | 25 Years            | 25 Years               | 25 Years              |
| Estimated replacement value                                                    | R450 000              | R250 000              | R450 000                  | R150 000          | R75 000             | R75 000               | R65 000                    | R65 000           | R55 000             | R55 000                | R120000               |
| Annual operating cost                                                          |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |
| Annual maintenance cost                                                        |                       |                       |                           |                   |                     |                       |                            |                   |                     |                        |                       |

No Data Available

| General information                                                                 | PS1                      | PS2                      | PS3                          | PS4                  | PS5                    | PS6                      | PS7                              | PS8                  | PS9                    | PS10                      | PS11                     |
|-------------------------------------------------------------------------------------|--------------------------|--------------------------|------------------------------|----------------------|------------------------|--------------------------|----------------------------------|----------------------|------------------------|---------------------------|--------------------------|
| Component name                                                                      | Keidebees<br>Booster P/S | Paballelo<br>Booster P/S | Kalahari-West<br>Booster P/S | Nakop<br>Booster P/S | Hotel Raw<br>Water P/S | Eiland<br>Irrigation P/S | Unievelde<br>Treated<br>Effluent | 8 SAI<br>Booster P/S | Airport<br>Booster P/S | Proefplaas<br>Booster P/S | Kalksloot<br>Booster P/S |
| Number of pumps                                                                     | 2                        | 2                        | 4                            | 2                    | 1                      | 1                        | 2                                | 1                    | 1                      | 1                         | 2                        |
| Pumping head (m)                                                                    | 25m                      | 25m                      | 175m                         | 135m                 | 55m                    | 30m                      | 35m                              | 62m                  | 80m                    | 150m                      | 57m                      |
| Discharge rate (l/s)                                                                | 340                      | 140                      | 32                           | 1.5                  | 90                     | 30                       | 30                               | 70                   | 10                     | 5                         | 14                       |
| Pump station Kilowatt                                                               | 2x75                     | 2x75                     | 4 x 55                       | 2 x 7.5              | 1 x 75                 | 1 x 15                   | 2 x 15                           | 1 x 32               | 1 x 11                 | 1 x 11                    | 2 x 15                   |
| Motor speed                                                                         | 1450                     | 1450                     | 2900                         | 2900                 | 1450                   | 1450                     | 1450                             | 1450                 | 2900                   | 2900                      | 1450                     |
| Type of power supply (solar, electricity,<br>engine, other – please state)          | Mains<br>Electricity     | Mains<br>Electricity     | Mains<br>Electricity         | Mains<br>Electricity | Mains<br>Electricity   | Mains<br>Electricity     | Mains<br>Electricity             | Mains<br>Electricity | Mains<br>Electricity   | Mains<br>Electricity      | Mains<br>Electricity     |
| Type of superstructure (concrete, brick,<br>structural steel, other – please state) | Concrete                 | Brick                    | Brick                        | Brick                | Concrete               | Mobile                   | Brick                            | Brick                | Brick                  | Brick                     | Brick                    |
| How much capacity is still available for<br>development? (%)                        | 30%                      | 10%                      | 10%                          | 10%                  | 0%                     | 0%                       | 0%                               | 0%                   | 0%                     | 0%                        | 5%                       |

It is not possible to quantify the operating costs and maintenance costs separately as the municipal financial system does not distinguish between the different pump stations.

**F 5.1.1.7 Existing bulk pipeline infrastructure (Upington only)**

| General information                                                            | Zone 1            | Zone 2       | Zone 3       |
|--------------------------------------------------------------------------------|-------------------|--------------|--------------|
| Component name                                                                 | Keidebees         | Central      | Updustria    |
| Component ID                                                                   |                   |              |              |
| Scheme name                                                                    | Upington          | Upington     | Upington     |
| <b>Operation</b>                                                               |                   |              |              |
| Is there any leakage control? (Pressure regulation) (Yes/No)                   | No                | No           | No           |
| How many illegal connections to date?                                          | Unknown           | Unknown      | Unknown      |
| Have illegal connections be formalised? (Yes/No)                               | No                | No           | No           |
| Have servitudes been registered? (Yes/No)                                      | No                | No           | No           |
| <b>Functionality</b>                                                           |                   |              |              |
| Describe the physical condition (unusable, poor, good)                         | Good              | Good         | Good         |
| How well is the infrastructure maintained? (none, infrequent, demand, planned) | Demand            | Demand       | Demand       |
| Are spare parts readily available? (Yes/No)                                    | Yes               | Yes          | Yes          |
| Number of breakages / failures per year                                        | <3                | <3           | <3           |
| What needs to be refurbished? (Cost)                                           | No Data Available |              |              |
| What needs to be replaced? (Cost)                                              |                   |              |              |
| <b>Institutional status</b>                                                    |                   |              |              |
| Current owner                                                                  | //Khara Hais      | //Khara Hais | //Khara Hais |
| Current operator                                                               | //Khara Hais      | //Khara Hais | //Khara Hais |
| Future owner / WSA (if applicable)                                             | N/A               | N/A          | N/A          |
| Future operator / WSP (if applicable)                                          | N/A               | N/A          | N/A          |
| <b>Asset assessment</b>                                                        |                   |              |              |
| Date constructed                                                               | 1983              | 1956         | 1977         |
| Expected total lifespan                                                        | 50 years          | 50 years     | 50 years     |
| Estimated replacement value                                                    | No Data Available |              |              |
| Annual operating cost                                                          |                   |              |              |
| Annual maintenance cost                                                        |                   |              |              |

| General information                                       |  | Zone 1       | Zone 2       | Zone 3       |
|-----------------------------------------------------------|--|--------------|--------------|--------------|
| Type & capacity                                           |  |              |              |              |
| Pipe material (Most common)                               |  | Fiber cement | Fiber cement | Fiber cement |
| Avg. Diameter (mm)                                        |  | 600          | 400          | 700          |
| Avg. Pipe Class                                           |  | 18           | 18           | 18           |
| Avg. Discharge rate (m <sup>3</sup> /sec)                 |  | Not metered  | Not metered  | Not metered  |
| Total Length above ground (m)                             |  | 0            | 0            | 0            |
| Total Length below ground (m)                             |  | 4 200        | 3 600        | 7 000        |
| Total Length of river crossings (m)                       |  | 0            | 0            | 0            |
| Total Length of road crossings (m)                        |  | Unknown      | Unknown      | Unknown      |
| How much capacity is still available for development? (%) |  | 30%          | 10%          | 15%          |

It is not possible to quantify the operating costs and maintenance costs separately as the municipal financial system does not distinguish between the different zones

The discharge in each rising main is difficult to quantify as it varies considerably depending on the system demand. The municipality is currently in a process of installing zone metering which will then provide this data in future.

### F 5.1.1.8 Existing Reservoir infrastructure

| General information                                                            | RES 1        | RES 2        | RES 3        | RES 4           | RES 5        | RES 6        | RES 7        | RES 8        | RES 9          | RES 10       | RES 11       |
|--------------------------------------------------------------------------------|--------------|--------------|--------------|-----------------|--------------|--------------|--------------|--------------|----------------|--------------|--------------|
| Component name                                                                 | Keidebees    | Central      | Updustria    | Lambrechtsdrift | Karos        | Leerkrans    | Ntsikellelo  | Leseding     | Louisvaleldorp | Raaswater    | Kalksloot    |
| Component ID                                                                   |              |              |              |                 |              |              |              |              |                |              |              |
| Scheme name                                                                    | Upington     | Upington     | Upington     | Lambrechtsdrift | Karos        | Leerkrans    | Ntsikellelo  | Leseding     | Louisvaleldorp | Raaswater    | Kalksloot    |
| <b>Operation</b>                                                               |              |              |              |                 |              |              |              |              |                |              |              |
| What is the storage factor (x daily use)                                       | 3            | 1.5          | 1.5          | 1.5             | 1.5          | 1.5          | 1.5          | 1.5          | 1.5            | 3            | 1.5          |
| <b>Functionality</b>                                                           |              |              |              |                 |              |              |              |              |                |              |              |
| Describe the physical condition (in operation, poor, good)                     | Good         | Good         | Good         | Good            | Good         | Good         | Good         | Good         | Good           | Good         | Good         |
| How well is the infrastructure maintained? (None, infrequent, demand, planned) | Demand       | Demand       | Demand       | Demand          | Demand       | Demand       | Demand       | Demand       | Demand         | Demand       | Demand       |
| Are spare parts readily available? (Yes/No)                                    | Yes          | Yes          | Yes          | Yes             | Yes          | Yes          | Yes          | Yes          | Yes            | Yes          | Yes          |
| Number of breakages / failures per year                                        | None         | None         | None         | None            | None         | None         | None         | None         | None           | None         | None         |
| What needs to be refurbished? (Cost)                                           |              |              |              |                 |              |              |              |              |                |              |              |
| What needs to be replaced? (Cost)                                              |              |              |              |                 |              |              |              |              |                |              |              |
| <b>Institutional status</b>                                                    |              |              |              |                 |              |              |              |              |                |              |              |
| Current owner                                                                  | //Khara Hais | //Khara Hais | //Khara Hais | //Khara Hais    | //Khara Hais | //Khara Hais | //Khara Hais | //Khara Hais | //Khara Hais   | //Khara Hais | //Khara Hais |
| Current operator                                                               | //Khara Hais | //Khara Hais | //Khara Hais | //Khara Hais    | //Khara Hais | //Khara Hais | //Khara Hais | //Khara Hais | //Khara Hais   | //Khara Hais | //Khara Hais |
| Future owner / WSA (if applicable)                                             | N/A          | N/A          | N/A          | N/A             | N/A          | N/A          | N/A          | N/A          | N/A            | N/A          | N/A          |
| Future operator / WSP (if applicable)                                          | N/A          | N/A          | N/A          | N/A             | N/A          | N/A          | N/A          | N/A          | N/A            | N/A          | N/A          |
| <b>Asset assessment</b>                                                        |              |              |              |                 |              |              |              |              |                |              |              |
| Date constructed                                                               | 1983         | 1956         | 1977         | 2000            | 1982         | 1982         | 2006         | 2004         | 2003           | 1992         | 1977         |
| Expected total lifespan                                                        | 50 years     | 50 years     | 50 years     | 25 years        | 25 years     | 25 years     | 25 years     | 25 years     | 25 years       | 25 years     | 25 years     |

| Estimated replacement value                                     | R21 million                 | R11 million     | R14.5 million     | R823 000        | R2.05 million   | R1.5 million    | R1.3 million    | R1.3 million    | R1.3 million    | R2.5 million                       | R2.5 million      |
|-----------------------------------------------------------------|-----------------------------|-----------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------------------------|-------------------|
| <b>General information</b>                                      | <b>RES 1</b>                | <b>RES 2</b>    | <b>RES 3</b>      | <b>RES 4</b>    | <b>RES 5</b>    | <b>RES 6</b>    | <b>RES 7</b>    | <b>RES 8</b>    | <b>RES 9</b>    | <b>RES 10</b>                      | <b>RES 11</b>     |
|                                                                 | Keidebees                   | Central         | Updustria         | Lambrechtsdrift | Karos           | Leerkrans       | Ntsikellelo     | Leseding        | Louisvaledorp   | Raaswater                          | Kalksloot         |
| Annual operating cost                                           |                             |                 |                   |                 |                 |                 |                 |                 |                 |                                    |                   |
| Annual maintenance cost                                         |                             |                 |                   |                 |                 |                 |                 |                 |                 |                                    |                   |
| <b>Type &amp; capacity</b>                                      |                             |                 |                   |                 |                 |                 |                 |                 |                 |                                    |                   |
| Is the reservoir elevated or on ground level?                   | Ground                      | Ground          | Ground            | Elevated        | Ground          | Ground          | Elevated        | Elevated        | Elevated        | Ground                             | Ground            |
| Type of material (concrete, brick, steel, other – please state) | Earth fill lined embankment | Square concrete | Circular Concrete | Sectional Steel | Sectional Steel | Sectional Steel | Sectional Steel | Sectional Steel | Sectional Steel | Circular Concrete+ Sectional Steel | Circular Concrete |
| Reservoir capacity                                              | 45MI                        | 23MI            | 30MI              | 120kl           | 300kl           | 220kl           | 200kl           | 200kl           | 200kl           | 680 kl<br>650kl                    | 425kl             |
| Is it a bulk or reticulation reservoir?                         | Bulk                        | Bulk            | Bulk              | Bulk            | Bulk            | Bulk            | Bulk            | Bulk            | Bulk            | Bulk                               | Bulk              |
| How much capacity is still available for development? (%)       | 30%                         | 0%              | 15%               | 10%             | 15%             | 15%             | 25%             | 25%             | 25%             | 5%                                 | 10%               |

No Data Available

It is not possible to quantify the operating costs and maintenance costs separately as the municipal financial system does not distinguish between the different components of the distribution system.

### F 5.1.1.9 Existing Sanitation Infrastructure

#### Upington

| Level of service                                 | No. of sanitation units |
|--------------------------------------------------|-------------------------|
| VIP toilets                                      | N/A                     |
| Other dry sanitation toilets                     | N/A                     |
| Septic tanks                                     | 954                     |
| Bulk sewer                                       | 11960                   |
| New wastewater treatment works or to be upgraded | N/A                     |
| Infrastructure for desludging and pit emptying   | N/A                     |

The data for Upington has not been verified

#### Lambrechtsdrift

| Level of service                                 | No. of sanitation units |
|--------------------------------------------------|-------------------------|
| VIP toilets                                      | 112                     |
| Other dry sanitation toilets                     | 40                      |
| Septic tanks                                     | 2                       |
| Bulk sewer                                       | N/A                     |
| New wastewater treatment works or to be upgraded | N/A                     |
| Infrastructure for desludging and pit emptying   | Yes                     |

#### Karos

| Level of service                                 | No. of sanitation units |
|--------------------------------------------------|-------------------------|
| VIP toilets                                      | 160                     |
| Other dry sanitation toilets                     | 34                      |
| Septic tanks                                     | 72                      |
| Bulk sewer                                       | N/A                     |
| New wastewater treatment works or to be upgraded | N/A                     |
| Infrastructure for desludging and pit emptying   | Yes                     |

#### Leerkrans

| Level of service                                 | No. of sanitation units |
|--------------------------------------------------|-------------------------|
| VIP toilets                                      | 143                     |
| Other dry sanitation toilets                     | 51                      |
| Septic tanks                                     | 40                      |
| Bulk sewer                                       | N/A                     |
| New wastewater treatment works or to be upgraded | N/A                     |
| Infrastructure for desludging and pit emptying   | Yes                     |

#### Ntsikellelo

| Level of service                                 | No. of sanitation units |
|--------------------------------------------------|-------------------------|
| VIP toilets                                      | 0                       |
| Other dry sanitation toilets                     | 93                      |
| Septic tanks                                     | 0                       |
| Bulk sewer                                       | N/A                     |
| New wastewater treatment works or to be upgraded | N/A                     |
| Infrastructure for desludging and pit emptying   | Yes                     |

#### Leseding

| Level of service                                 | No. of sanitation units |
|--------------------------------------------------|-------------------------|
| VIP toilets                                      | 15                      |
| Other dry sanitation toilets                     | 211                     |
| Septic tanks                                     | N/A                     |
| Bulk sewer                                       | N/A                     |
| New wastewater treatment works or to be upgraded | N/A                     |
| Infrastructure for desludging and pit emptying   | Yes                     |

## Louisvaledorp

| Level of service                                 | No. of sanitation units |
|--------------------------------------------------|-------------------------|
| VIP toilets                                      | 190                     |
| Other dry sanitation toilets                     | 26                      |
| Septic tanks                                     | 11                      |
| Bulk sewer                                       | N/A                     |
| New wastewater treatment works or to be upgraded | N/A                     |
| Infrastructure for desludging and pit emptying   | Yes                     |

## Raaswater

| Level of service                                 | No. of sanitation units |
|--------------------------------------------------|-------------------------|
| VIP toilets                                      | 45                      |
| Other dry sanitation toilets                     | 131                     |
| Septic tanks                                     | 358                     |
| Bulk sewer                                       | N/A                     |
| New wastewater treatment works or to be upgraded | N/A                     |
| Infrastructure for desludging and pit emptying   | N/A                     |

## Kalksloot

| Level of service                                 | No. of sanitation units |
|--------------------------------------------------|-------------------------|
| VIP toilets                                      | 131                     |
| Other dry sanitation toilets                     | 59                      |
| Septic tanks                                     | 241                     |
| Bulk sewer                                       | N/A                     |
| New wastewater treatment works or to be upgraded | N/A                     |
| Infrastructure for desludging and pit emptying   | N/A                     |

### F 5.1.1.11 Existing Sewage Treatment infrastructure

| General information                                                            | STW1                              | STW2                         |
|--------------------------------------------------------------------------------|-----------------------------------|------------------------------|
| Component name                                                                 | Kameelmond Sewage Treatment Plant | Louisvaleweg Oxidation Ponds |
| Component ID                                                                   |                                   |                              |
| Scheme name                                                                    | Uppington                         | Uppington                    |
| <b>Institutional status</b>                                                    |                                   |                              |
| Current owner                                                                  | //Khara Hais                      | //Khara Hais                 |
| Current operator                                                               | //Khara Hais                      | //Khara Hais                 |
| Future owner / WSA (If applicable)                                             | N/A                               | N/A                          |
| Future operator / WSP (If applicable)                                          | N/A                               | N/A                          |
| <b>Asset assessment</b>                                                        |                                   |                              |
| Date constructed                                                               | 1989                              | 1988                         |
| Expected total lifespan                                                        | 30 years                          | 20 years                     |
| Estimated replacement value                                                    | R56 million                       | R3.2million                  |
| Annual operating cost                                                          | No Data Available                 |                              |
| Annual maintenance cost                                                        |                                   |                              |
| <b>Type (process) &amp; capacity</b>                                           |                                   |                              |
| Type of plant (i.e. Activated sludge / Bio-filter / Oxidation Ponds)           | Biofilters + Activated Sludge     | Oxidation Ponds              |
| Design Capacity - Hydraulic Load (ML/day)                                      | 16 ML/day                         | 0.8 ML/day                   |
| How much capacity is still available for development? (%)                      | 20%                               | 0%                           |
| Design Capacity - Organic Load (COD kg/day)                                    | 8000                              | 450                          |
| How much capacity is still available for development? (%)                      | 40%                               | 0%                           |
| Inlet meter (type)                                                             | Open channel flume                | Flomag                       |
| <b>Operation</b>                                                               |                                   |                              |
| Total volume of water received and treated per year (ML)                       | 4312.755                          | 267.114                      |
| Operating hours per day                                                        | 24                                | 24                           |
| Discharge into (description of source)                                         | Orange River                      | Irrigation Plot              |
| Discharge volume (ML/annum)                                                    | Not measured                      | Not measured                 |
| Volume of effluent recycled (ML/annum)                                         | 395 ML                            |                              |
| Component name                                                                 | Kameelmond Sewage Treatment Plant | Louisvaleweg Oxidation Ponds |
| Applications of recycled effluent (i.e. irrigation, mining, etc)               | Irrigation of sportsfields        |                              |
| Effluent control (by whom)                                                     | //Khara Hais                      | //Khara Hais                 |
| Permitted effluent (ML/annum)                                                  | 5840                              | 292                          |
| Sludge produced (m³/annum)                                                     | 1221                              | Unknown                      |
| How often is water quality monitored? (daily, weekly, monthly, annual, never)  | Bi Monthly                        | Bi Monthly                   |
| What laboratory is used?                                                       | AL Abbott & Assoc                 | AL Abbott & Assoc            |
| % Of the time that effluent is chlorinated                                     | 100%                              | 0%                           |
| <b>Functionality</b>                                                           |                                   |                              |
| Describe the physical condition (in operation, poor, good)                     | Good                              | Good                         |
| How well is the infrastructure maintained? (none, infrequent, demand, planned) | Planned                           | Demand                       |
| Are spare parts readily available? (Yes/No)                                    | Yes                               | Yes                          |
| Number of breakages / failures per year                                        | <5                                | <3                           |
| What needs to be refurbished? (cost)                                           | No Data Available                 |                              |
| What needs to be replaced? (cost)                                              |                                   |                              |

### F 5.1.1.12 Existing asset management Assessment Key to analysis:

| Assessment Symbol | Explanation               |
|-------------------|---------------------------|
| N/R               | Not required              |
| Z                 | Zero compliance           |
| 1                 | Below minimum requirement |
| 2                 | Minimum requirement       |
| 3                 | Above minimum requirement |

| Impact Symbol | Explanation |
|---------------|-------------|
| F             | Fatal       |
| M             | Medium      |
| L             | Low         |
| No            | No impact   |
|               |             |

| Element Description |                             | Assessment Criteria                                                                                                                                                                                                                                                                                         | Assessment                          | Impact                              |
|---------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|
| Resources           | <b>Staff</b>                | Sufficient staff numbers<br>Competency level of staff<br>Level of service provided by staff<br>Empowerment & Training:<br><ul style="list-style-type: none"> <li>Adequately trained for position</li> <li>Safety regulation</li> <li>Commitment</li> </ul> Responsibility allocation and acceptance thereof | 2<br>2<br>2<br><br>1<br>2<br>2<br>1 | M<br>F<br>M<br><br>F<br>F<br>M<br>F |
|                     | <b>External Resources</b>   | Need for External resource providers<br>Competency level and value for money<br>Management and control of service providers                                                                                                                                                                                 | 3<br>3<br>2                         | M<br>M<br>F                         |
|                     | <b>Materials</b>            | Adequate materials provisioning<br>Store Management:<br><ul style="list-style-type: none"> <li>Sufficient stock kept</li> <li>Stock Control</li> <li>Delivery Time</li> </ul>                                                                                                                               | 2<br><br>2<br>1<br>1                | F<br><br>F<br>F<br>M                |
|                     | <b>Tools and Equipment</b>  | Adequate tools and equipment provided<br>Control and maintenance                                                                                                                                                                                                                                            | 2<br>2                              | F<br>F                              |
|                     | <b>Transport</b>            | Adequate transport provisioning<br>Control:<br><ul style="list-style-type: none"> <li>Log Sheets</li> <li>Vehicle maintenance</li> <li>Fuel consumption</li> <li>Trip authorization</li> </ul>                                                                                                              | 2<br><br>2<br>2<br>1<br>1           | F<br><br>M<br>F<br>F<br>M           |
|                     | <b>Budget</b>               | Adequate Budget provided<br>Budget control<br>Identification and documenting of needs<br>Budget preparation and motivation                                                                                                                                                                                  | 2<br>2<br>3<br>2                    | F<br>F<br>F<br>M                    |
| Information         | <b>Manuals</b>              | Existence of manuals (operation&maintenance / other)<br>Record keeping / safekeeping & control<br>Utilization of manuals by staff                                                                                                                                                                           | 2<br>1<br>1                         | M<br>M<br>M                         |
|                     | <b>As-Built Information</b> | Existence of As-built drawings<br>Existence of important reports (design reports, etc)<br>Record keeping / safekeeping & control<br>Accessibility of information<br>Updating of records                                                                                                                     | 3<br>2<br>2<br>2<br>1               | M<br>M<br>F<br>F<br>F               |
|                     | <b>Element Description</b>  | <b>Assessment Criteria</b>                                                                                                                                                                                                                                                                                  | <b>Assessment</b>                   | <b>Impact</b>                       |
|                     | <b>Asset register</b>       | Existence of an asset register                                                                                                                                                                                                                                                                              | 2                                   | F                                   |

|                         |                                  |                                                                                                                                                                                                                                                                                                         |                                 |                                 |
|-------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------|
|                         |                                  | Maintenance/updating of asset register<br>Accessibility of information<br>Control over assets<br>Stock taking                                                                                                                                                                                           | 2<br>1<br>2<br>2                | M<br>M<br>F<br>F                |
|                         | <b>Contingency and Safety</b>    | Compliance to safety requirements<br>Safety equipment and maintenance thereof<br>Existence of safety plans where required<br>Existence of contingency plans where required                                                                                                                              | 2<br>1<br>2<br>2                | F<br>F<br>F<br>F                |
| <b>Activity Control</b> | <b>Policies &amp; Procedures</b> | Existence of procedures for all activities<br>Existence of policies – standardization, quality, etc<br>Correctness of procedures (if in place)                                                                                                                                                          | 1<br>2<br>2                     | F<br>F<br>M                     |
|                         | <b>Record Keeping</b>            | Existence of a Record Keeping system<br>Processing of Data<br>Actions activated                                                                                                                                                                                                                         | 2<br>2<br>1                     | F<br>F<br>M                     |
|                         | <b>Quality Control</b>           | Quality management plan<br>Quality assurance<br>Quality control <ul style="list-style-type: none"> <li>• Inspections</li> <li>• Control Charts</li> <li>• Trend analysis</li> </ul> Process adjustment and rework<br>Quality improvement                                                                | 2<br>2<br>2<br>1<br>1<br>1<br>1 | M<br>M<br>M<br>M<br>M<br>M<br>M |
| <b>Management</b>       | <b>Risk Management</b>           | Risk management planning<br>Risk identification<br>Risk probability and impact assessment<br>Risk response planning<br>Risk monitoring and control                                                                                                                                                      | 2<br>2<br>1<br>2<br>1           | F<br>F<br>M<br>M<br>M           |
|                         | <b>Reporting</b>                 | Production and Activity reporting <ul style="list-style-type: none"> <li>• Completeness</li> <li>• Evaluation and action activation</li> </ul> Management Reporting <ul style="list-style-type: none"> <li>• Completeness</li> <li>• Evaluation and action activation</li> </ul> Performance monitoring | 2<br>2<br>2<br>2<br>2           | M<br>M<br>M<br>M<br>M           |

## F.6 Water Balance

### F 6.1.1 Situation Assessment

**F 6.1.1.1 Amount of Bulk water abstracted**

| Source       | Current  | Year 1   | Year 2   | Year 3   | Year 4   | Year 5   |
|--------------|----------|----------|----------|----------|----------|----------|
| Orange River | 13305365 | 13411808 | 13519102 | 13627255 | 13736273 | 13846163 |
|              |          |          |          |          |          |          |

**F 6.1.1.3 Water supplied to consumers (kl / year) – urban**

| Consumers                                                                    | Current | Year 1  | Year 2  | Year 3  | Year 4   | Year 5   |
|------------------------------------------------------------------------------|---------|---------|---------|---------|----------|----------|
| Residential & Commercial water supply                                        | 6410620 | 6795257 | 7202973 | 7635151 | 8093260  | 8578856  |
| Municipal use supply (facilities and recreational areas)                     | 273332  | 286999  | 301349  | 316416  | 332237   | 348849   |
| Water supply to Parks                                                        | 114411  | 114411  | 114411  | 114411  | 114411   | 114411   |
| Water supply to sports bodies and clubs                                      | 1215    | 1215    | 1215    | 1215    | 1215     | 1215     |
| Other supply (including water supplied to other water services institutions) | Nil     | Nil     | Nil     | Nil     | Nil      | Nil      |
| <b>Sub-total (treated water supplied)</b>                                    | 6799578 | 7197882 | 7619947 | 8067193 | 8541123  | 9043330  |
| Municipal Raw water supply (untreated)                                       | 990058  | 1049461 | 1112429 | 1179175 | 1249925  | 1324921  |
| Raw water supply to general consumers                                        | 424431  | 449897  | 476891  | 505504  | 535834   | 567984   |
| Recycled ( treated effluent) (to be reported as negative figure)             | -995    | -1025   | -1056   | -1087   | -1120    | -1153    |
| <b>Total treated and raw water supplied</b>                                  | 8213072 | 8696215 | 9208211 | 9750785 | 10325763 | 10935082 |
| Physical potable water losses (bulk water supplied minus Total supplied)     | 5092293 | 4715593 | 4310891 | 3876470 | 3410511  | 2911081  |
| Percentage losses+ Unaccounted for Water                                     | 38.3%   | 35.2%   | 31.9%   | 28.4%   | 24.8%    | 21.0%    |

The losses calculated in the table above translate to a loss percentage of **38%**. This is high and needs to be addressed. This figure includes physical losses at treatment stage (roughly 15% due to desludging and backwashing) and distribution losses (8% due to leaks, pipe breaks, etc) and the balance probably represents unaccounted for water (15%). All three of these factors need to be addressed by the municipality in order to reduce this figure. The municipality's target for the next 5 years is to firstly reduce the unaccounted for water to a figure below 5% and secondly to reduce the total water losses to below 20%.

**Zone Metering**

It must be stressed that this water balance is a rough calculation based purely on the data received from the municipality with nothing to compare or judge the integrity thereof. The municipality is currently in process of installing zone meters throughout Upington in order to correlate the totals derived from household meter readings for each zone.

**F 6.1.1.6 Total effluent received at treatment works (Ml/year)**

| Source | Resource Name | Works Name                 | Prior 1 |       | Current |       | Year 1 |       | Year 2 |       | Year 3 |       | Year 4 |       | Year 5 |       |
|--------|---------------|----------------------------|---------|-------|---------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
|        |               |                            | Tot     | % Ind | Tot     | % Ind | Tot    | % Ind | Tot    | % Ind | Tot    | % Ind | Tot    | % Ind | Tot    | % Ind |
| 1      | Orange River  | Kameelmond Treatment Works | 4193    |       | 3666    |       | 3724   |       | 3784   |       | 3844   |       | 3906   |       | 3968   |       |
| 2      | N/A           | Louisvale Ox Ponds         | 232     |       | 267     |       | 271    |       | 276    |       | 281    |       | 285    |       | 291    |       |

**F 6.1.1.6.1 Total returns to the water resource system**

Only the Kameelmond Wastewater Treatment plant returns treated effluent to the Orange River. The treated effluent returned to the source is currently not measured. The treated effluent does however comply with the DWAF General Standard quality requirements.

## **F.7 Water Services Institutional Arrangements**

### F 7.1.1 Situation Assessment

#### F 7.1.1.1 WSA functions and outputs

| WSA functions / outputs                                                            | In place?<br>(Yes/ no/ N/A) | Resources available to perform function? (Yes/ No/ N/A) |         |                |           | If no, when will it be in place? | Support required (yes/no) |
|------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------------------|---------|----------------|-----------|----------------------------------|---------------------------|
|                                                                                    |                             | Budget                                                  | Bylaws  | Infrastructure | Personnel |                                  |                           |
| <b>Policy development</b>                                                          |                             |                                                         |         |                |           |                                  |                           |
| Indigent Policy                                                                    | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Free basic water policy (including equitable share)                                | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Free basic sanitation policy                                                       | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| <b>Procurement policy</b>                                                          |                             |                                                         |         |                |           |                                  |                           |
| Credit control & debt collection policy                                            | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Regulation and tariffs                                                             | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Water Services bylaws with conditions as required by the Water Services Act        | Partial                     | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Mechanisms to ensure compliance with bylaws                                        | Partial                     | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| <b>Tariff structure</b>                                                            |                             |                                                         |         |                |           |                                  |                           |
| Tariffs promulgated                                                                | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Infrastructure development (projects)                                              | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Mechanisms to undertake project feasibility studies                                | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Criteria for prioritising projects                                                 | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Mechanisms to assess & approve project business plans                              | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Mechanisms for selecting, contracting, managing and monitoring implementing agents | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Mechanisms to monitor project implementation                                       | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| <b>Water conservation and demand management</b>                                    |                             |                                                         |         |                |           |                                  |                           |
| Water conservation and demand management strategy                                  | No                          | Yes                                                     | Unknown | No             | Yes       |                                  | No                        |
| <b>Performance management and monitoring</b>                                       |                             |                                                         |         |                |           |                                  |                           |
| Performance management systems                                                     | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Water service monitoring and evaluation (M&E) system                               | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| <b>WSDP</b>                                                                        |                             |                                                         |         |                |           |                                  |                           |
| WSDP information system                                                            | Partial                     | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Mechanisms for stakeholder participation                                           | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| Mechanisms to monitor and report on WSDP implementation                            | Yes                         | Yes                                                     | Unknown | Yes            | Yes       |                                  | No                        |
| <b>WSP institutional arrangements</b>                                              |                             |                                                         |         |                |           |                                  |                           |
| Criteria to select appropriate WSPs                                                | N/A                         | N/A                                                     | N/A     | N/A            | N/A       | N/A                              | N/A                       |
| Mechanisms to contract, manage and monitor WSPs                                    | N/A                         | N/A                                                     | N/A     | N/A            | N/A       | N/A                              | N/A                       |
| Mechanisms to approve WSP business plans                                           | N/A                         | N/A                                                     | N/A     | N/A            | N/A       | N/A                              | N/A                       |
| <b>WSA overall capacity</b>                                                        |                             |                                                         |         |                |           |                                  |                           |
| Sufficient staff and systems to fulfil all WSA functions                           | Yes                         | Yes                                                     | Yes     | Yes            | Yes       |                                  | No                        |
| Other (state)                                                                      | N/A                         | N/A                                                     | N/A     | N/A            | N/A       | N/A                              | N/A                       |

No Data Available

#### F 7.1.1.2 WSA Capacity Development

The //Khara Hais municipality currently has sufficient capacity in terms of human resources, funding and systems to deliver an effective service to its communities.

#### F 7.1.1.3 Bylaws affecting water services

| ID | Bylaw name | Short description | Criteria | Effect on water services |
|----|------------|-------------------|----------|--------------------------|
|    |            |                   |          |                          |
|    |            |                   |          |                          |

No Data Available

#### F 7.1.1.12 WSP Staffing levels : water

|                                           | Number of employees             |                   |          |                        |                |       |
|-------------------------------------------|---------------------------------|-------------------|----------|------------------------|----------------|-------|
|                                           | Executive and senior management | Middle management | Clerical | Supervisory or artisan | General worker | Total |
| 1. Finance and administration             | 2                               | 5                 | 45       | N/A                    | 1              | 53    |
| 2. Projects and planning                  | 1                               |                   | 1        | N/A                    | 1              | 3     |
| 3. Operations                             | 1                               | 3                 | 2        | 6                      |                | 12    |
| 4. Bulk service                           |                                 | 1                 | 0        | 2                      | 10             | 13    |
| 5. Distribution services                  |                                 | 1                 | 2        | 2                      | 23             | 28    |
| 6. Customer services                      |                                 | 1                 | 1        |                        |                | 2     |
| 7. Total                                  | 4                               | 11                | 51       | 10                     | 35             | 111   |
| 8. Projection of total in five years time |                                 |                   |          |                        |                | 115   |

#### F 7.1.1.13 WSP Staffing levels : sanitation

|                                            | Number of employees             |                   |          |                        |                |       |
|--------------------------------------------|---------------------------------|-------------------|----------|------------------------|----------------|-------|
|                                            | Executive and senior management | Middle management | Clerical | Supervisory or artisan | General worker | Total |
| 9. Finance and administration              | 2                               | 5                 | 45       | N/A                    | 1              | 53    |
| 10. Projects and planning                  | 1                               |                   | 1        | N/A                    | 1              | 3     |
| 11. Operations                             | 1                               | 3                 | 2        | 6                      |                | 12    |
| 12. Bulk service                           |                                 | 1                 | 0        | 2                      | 23             | 26    |
| 13. Distribution services                  |                                 | 1                 | 1        | 3                      | 13             | 18    |
| 14. Customer services                      |                                 | 1                 | 1        |                        |                | 2     |
| 15. Total                                  | 4                               | 11                | 50       | 11                     | 38             | 114   |
| 16. Projection of total in five years time |                                 |                   |          |                        |                | 120   |

### F.8 Customer Service Profile

## F 8.1 Customer Services

### F 8.1.1 Situation Assessment (Customer Services)

#### F 8.1.1.1 Quality of Service for water : urban

|                                               | Resources available to perform function (Yes/ No/ N/A) |         |                |           |
|-----------------------------------------------|--------------------------------------------------------|---------|----------------|-----------|
|                                               | Budget                                                 | Bylaws  | Infrastructure | Personnel |
| Quality of service for water: urban           | Yes                                                    | Unknown | Yes            | Yes       |
| Quality of service for water: rural           | Yes                                                    | Unknown | Yes            | Yes       |
| Attending to complaints for water: urban      | Yes                                                    | Unknown | Yes            | Yes       |
| Attending to complaints for water: rural      | Yes                                                    | Unknown | Yes            | Yes       |
| Attending to complaints for sanitation: urban | Yes                                                    | Unknown | Yes            | Yes       |
| Attending to complaints for sanitation: rural | Yes                                                    | Unknown | Yes            | Yes       |
| Education for basic water services            | N/A                                                    | Unknown | No             | No        |
| Pollution awareness                           | N/A                                                    | Unknown | No             | No        |

#### F 8.1.1.2 Quality of Service for water: rural

|                                               | Resources available to perform function (Yes/ No/ N/A) |         |                |           |
|-----------------------------------------------|--------------------------------------------------------|---------|----------------|-----------|
|                                               | Budget                                                 | Bylaws  | Infrastructure | Personnel |
| Quality of service for water: urban           | Yes                                                    | Unknown | Yes            | Yes       |
| Quality of service for water: rural           | Yes                                                    | Unknown | Yes            | Yes       |
| Attending to complaints for water: urban      | Yes                                                    | Unknown | Yes            | Yes       |
| Attending to complaints for water: rural      | Yes                                                    | Unknown | Yes            | Yes       |
| Attending to complaints for sanitation: urban | Yes                                                    | Unknown | Yes            | Yes       |
| Attending to complaints for sanitation: rural | Yes                                                    | Unknown | Yes            | Yes       |
| Education for basic water services            | N/A                                                    | Unknown | No             | No        |
| Pollution awareness                           | N/A                                                    | Unknown | No             | No        |

#### F 8.1.1.3 Attending to complaints for water: urban

|                                                                                         | Current | Record: Prior     |       |       |       |       |
|-----------------------------------------------------------------------------------------|---------|-------------------|-------|-------|-------|-------|
|                                                                                         |         | -Yr 1             | -Yr 2 | -Yr 3 | -Yr 4 | -Yr 5 |
| Total number of consumer units                                                          | 10734   |                   |       |       |       |       |
| No. Complaints of quality of service per year divided by total number of consumer units | 9.08    |                   |       |       |       |       |
| Number of queries received within the year                                              | 494     | No Data Available |       |       |       |       |
| % Queries responded to within 24 hours                                                  | 95%     |                   |       |       |       |       |
| Number of major or visible leaks reported within the year                               | 182     |                   |       |       |       |       |
| % Major or visible leaks repaired within 48 hours after being reported.                 | 100%    |                   |       |       |       |       |

#### F 8.1.1.4 Attending to complaints for water: rural

|                                                                                         | Current | Record: Prior     |       |       |       |       |
|-----------------------------------------------------------------------------------------|---------|-------------------|-------|-------|-------|-------|
|                                                                                         |         | -Yr 1             | -Yr 2 | -Yr 3 | -Yr 4 | -Yr 5 |
| Total number of consumer units                                                          | 2105    |                   |       |       |       |       |
| No. Complaints of quality of service per year divided by total number of consumer units | 7.15    |                   |       |       |       |       |
| Number of queries received within the year                                              | 506     | No Data Available |       |       |       |       |
| % Queries responded to within 24 hours                                                  | 95%     |                   |       |       |       |       |
| Number of major or visible leaks reported within the year                               | 84      |                   |       |       |       |       |
| % Major or visible leaks repaired within 48 hours after being reported.                 | 100%    |                   |       |       |       |       |

#### F 8.1.1.5 Attending to complaints for sanitation: urban

| Discharge to treatment works                                                         | Current | Record: Prior     |       |       |       |       |
|--------------------------------------------------------------------------------------|---------|-------------------|-------|-------|-------|-------|
|                                                                                      |         | -Yr 1             | -Yr 2 | -Yr 3 | -Yr 4 | -Yr 5 |
| 1. Number of queries/ complaints received within the year                            | 10 734  |                   |       |       |       |       |
| 2. % Queries responded to within 24 hours                                            | 96%     |                   |       |       |       |       |
| 3. Number of blockages reported within the year                                      | 1280    |                   |       |       |       |       |
| 4. % Blockages repaired within 48 hours after being reported                         | 99%     | No Data Available |       |       |       |       |
| 5. No. Complaints per year divided by total number of consumer units                 | 8.4     |                   |       |       |       |       |
| Pit/tank pumping                                                                     |         |                   |       |       |       |       |
| 6. Number of pits/ tanks                                                             | 954     |                   |       |       |       |       |
| 7. Number of calls received within the year for emptying                             | Unknown |                   |       |       |       |       |
| 8. Number of calls received within the year for emergency maintenance to pits/ tanks | Unknown |                   |       |       |       |       |

#### F 8.1.1.6 Attending to complaints for sanitation: rural

All rural villages are equipped with dry sanitation systems with the exception of Raaswater and Kalksloot villages. There is no data available for these areas.

#### F 8.1.1.7 Education for basic water services

| No. Consumer units to be targeted by:                    | Current | Record: Prior |       |       |       |       |
|----------------------------------------------------------|---------|---------------|-------|-------|-------|-------|
|                                                          |         | -Yr 1         | -Yr 2 | -Yr 3 | -Yr 4 | -Yr 5 |
| 1. Sanitation promotion and health and hygiene awareness | Unknown |               |       |       |       |       |
| 2. Water education (including water conservation)        | Unknown |               |       |       |       |       |

#### F 8.1.1.8 Pollution Awareness

|                                                    |         |    |
|----------------------------------------------------|---------|----|
| Does the WSA have a pollution awareness programme? | Yes     | No |
| If no, when will such a programme be in place?     | Unknown |    |

### F.9 Financial Profile

## F 9.1 Capital Funds

### F 9.1.1 Situation Assessment

#### F 9.1.1.1 Capital Expenditure: water (R x million)

|                                                                                     | Current | Record: Prior     |   |       |   |       |   |       |   |       |   |
|-------------------------------------------------------------------------------------|---------|-------------------|---|-------|---|-------|---|-------|---|-------|---|
|                                                                                     |         | -Yr 1             |   | -Yr 2 |   | -Yr 3 |   | -Yr 4 |   | -Yr 5 |   |
|                                                                                     |         | U                 | R | U     | R | U     | R | U     | R | U     | R |
| 1. Internal infrastructure                                                          | 1.490   |                   |   |       |   |       |   |       |   |       |   |
| 2. Connector infrastructure                                                         | 2.514   |                   |   |       |   |       |   |       |   |       |   |
| 3. Bulk infrastructure                                                              | 6.472   | No Data Available |   |       |   |       |   |       |   |       |   |
| 4. Other                                                                            | Nil     |                   |   |       |   |       |   |       |   |       |   |
| 5. Total (1+2+3+4)                                                                  | 10.476  |                   |   |       |   |       |   |       |   |       |   |
| 6. Cost per connection (item 5 divided by number of new connections being provided) | 4764.75 |                   |   |       |   |       |   |       |   |       |   |

#### F 9.1.1.2 Capital Expenditure: sanitation (R x million)

|                                                                                     | Current | Record: Prior |   |       |   |       |   |       |   |       |   |
|-------------------------------------------------------------------------------------|---------|---------------|---|-------|---|-------|---|-------|---|-------|---|
|                                                                                     |         | -Yr 1         |   | -Yr 2 |   | -Yr 3 |   | -Yr 4 |   | -Yr 5 |   |
|                                                                                     |         | U             | R | U     | R | U     | R | U     | R | U     | R |
| 1. Internal infrastructure                                                          | Nil     |               |   |       |   |       |   |       |   |       |   |
| 2. Connector infrastructure                                                         | 6.772   |               |   |       |   |       |   |       |   |       |   |
| 3. Bulk infrastructure                                                              | 0.68    |               |   |       |   |       |   |       |   |       |   |
| 4. VIP toilets & other dry sanitation system                                        | 0.286   |               |   |       |   |       |   |       |   |       |   |
| 5. Soft issues (training, H&HE and awareness)                                       | Nil     |               |   |       |   |       |   |       |   |       |   |
| 6. Other                                                                            | Nil     |               |   |       |   |       |   |       |   |       |   |
| 7. Total (1+2+3+4)                                                                  | 7.738   |               |   |       |   |       |   |       |   |       |   |
| 8. Cost per connection (item 5 divided by number of new connections being provided) | 6864    |               |   |       |   |       |   |       |   |       |   |

No Data Available

#### F 9.1.1.3 Sources of capital income: water

|                                                   | Current | Record: Prior     |       |       |       |       |
|---------------------------------------------------|---------|-------------------|-------|-------|-------|-------|
|                                                   |         | -Yr 1             | -Yr 2 | -Yr 3 | -Yr 4 | -Yr 5 |
| Subsidies                                         |         |                   |       |       |       |       |
| 1. Housing                                        |         |                   |       |       |       |       |
| 2. CMIP                                           |         |                   |       |       |       |       |
| 3. CWSS (from DWAF)                               |         |                   |       |       |       |       |
| 4. Sub-total: subsidies                           |         |                   |       |       |       |       |
| Other income                                      |         |                   |       |       |       |       |
| 5. Other ad hoc grants which may become available |         |                   |       |       |       |       |
| 6. Consumer payments                              |         | No Data Available |       |       |       |       |
| 7. Expenditure from current income                |         |                   |       |       |       |       |
| 8. Sub-total (5 + 6 + 7):                         |         |                   |       |       |       |       |
| Loans                                             |         |                   |       |       |       |       |
| 9. Capital development fund                       |         |                   |       |       |       |       |
| 10. External                                      |         |                   |       |       |       |       |
| 11. Sub-total: loans                              |         |                   |       |       |       |       |
| 12. Total (4 + 8 + 11)                            |         |                   |       |       |       |       |

#### F 9.1.1.4 Sources of capital income: sanitation

|                                                   | Current | Record: Prior     |       |       |       |       |
|---------------------------------------------------|---------|-------------------|-------|-------|-------|-------|
|                                                   |         | -Yr 1             | -Yr 2 | -Yr 3 | -Yr 4 | -Yr 5 |
| Subsidies                                         |         |                   |       |       |       |       |
| 1. Housing                                        |         |                   |       |       |       |       |
| 2. CMIP                                           |         |                   |       |       |       |       |
| 3. CWSS (from DWAF)                               |         |                   |       |       |       |       |
| 4. Sub-total: subsidies                           |         |                   |       |       |       |       |
| Other income                                      |         |                   |       |       |       |       |
| 5. Other ad hoc grants which may become available |         | No Data Available |       |       |       |       |
| 6. Consumer payments                              |         |                   |       |       |       |       |
| 7. Expenditure from current income                |         |                   |       |       |       |       |
| 8. Sub-total (5 + 6 + 7):                         |         |                   |       |       |       |       |
| Loans                                             |         |                   |       |       |       |       |
| 9. Capital development fund                       |         |                   |       |       |       |       |
| 10. External                                      |         |                   |       |       |       |       |
| 11. Sub-total: loans                              |         |                   |       |       |       |       |
| 12. Total (4 + 8 + 11)                            |         |                   |       |       |       |       |

## F 9.2 Operating costs and income

## F 9.2.1 Situation assessment (Operating costs and income)

### F 9.2.1.1 Operating costs : water

| Item | Description                              | Prior               | Current              | Year 1               | Year 2               | Year 3   | Year 4   | Year 5   |
|------|------------------------------------------|---------------------|----------------------|----------------------|----------------------|----------|----------|----------|
| 1    | Salaries and related costs: Bulk Water   | 1,140,026.00        | 1,589,882.00         | 1,596,192.00         | 1,691,962.00         | -----    | -----    | -----    |
|      | Salaries and related costs: Distribution | 1,284,316.00        | 1,624,195.00         | 1,409,025.00         | 1,493,566.00         |          |          |          |
|      |                                          |                     |                      |                      |                      |          |          |          |
| 2    | General Expenses: Bulk Water             | 2,254,039.00        | 3,032,694.00         | 3,083,323.00         | 3,268,322.00         | -----    | -----    | -----    |
|      | General Expenses: Distribution           | 309,517.00          | 379,726.00           | 362,712.00           | 384,473.00           | -----    | -----    | -----    |
|      |                                          |                     |                      |                      |                      |          |          |          |
| 3    | Bulk water purchases                     | 504,009.00          | 1,222,562.00         | 1,260,572.00         | 1,336,206.00         | -----    | -----    | -----    |
|      |                                          |                     |                      |                      |                      |          |          |          |
| 4    | Professional service providers           | -----               | 85,000.00            | -----                | -----                | -----    | -----    | -----    |
|      |                                          |                     |                      |                      |                      |          |          |          |
| 5    | Departmental Expenses: Bulk Water        | 1,221,904.00        | 1,382,984.00         | 1,466,344.00         | 1,554,325.00         | -----    | -----    | -----    |
|      | Departmental Expenses: Distribution      | 317,095.00          | 612,000.00           | 694,130.00           | 735,778.00           | -----    | -----    | -----    |
|      |                                          |                     |                      |                      |                      |          |          |          |
| 6    | Repairs and Maintenance: Bulk Water      | 466,875.00          | 568,207.00           | 599,731.00           | 635,715.00           | -----    | -----    | -----    |
|      | Repairs and Maintenance: Distribution    | 271,367.00          | 464,201.00           | 462,123.00           | 489,851.00           | -----    | -----    | -----    |
|      |                                          |                     |                      |                      |                      |          |          |          |
| 7    | Financing Costs: Bulk Water              | 878,435.00          | 4,131,235.00         | -----                | -----                | -----    | -----    | -----    |
|      | Financing Costs: Distribution            |                     | 2,568,002.00         | -----                | -----                | -----    | -----    | -----    |
|      |                                          |                     |                      |                      |                      |          |          |          |
| 8    | <b>Total Expences : Water</b>            | <b>8,647,583.00</b> | <b>17,660,688.00</b> | <b>10,934,152.00</b> | <b>11,590,198.00</b> | <b>0</b> | <b>0</b> | <b>0</b> |

### F 9.2.1.2 Operating costs: sanitation

| Item | Description                                     | Prior            | Current          | Year 1           | Year 2           | Year 3   | Year 4   | Year 5   |
|------|-------------------------------------------------|------------------|------------------|------------------|------------------|----------|----------|----------|
| 1    | Salaries and related costs: Bulk Treatment      | 1,852,812        | 2,229,095        | 3,226,876        | 3,420,490        | -----    | -----    | -----    |
|      | Salaries and related costs: Network Maintenance | 653,766          | 1,276,876        | -----            | -----            | -----    | -----    | -----    |
|      | Salaries and related costs: Sanitation          | 460,932          | 750,778          | 419,183          | 444,335          | -----    | -----    | -----    |
| 2    | General Expenses: Bulk Treatment                | 955,246          | 1,185,627        | 1,059,437        | 1,123,002        | -----    | -----    | -----    |
|      | General Expenses: Network Maintenance           | 11,375           | 87,029           | 70,556           | 74,788           | -----    | -----    | -----    |
|      | General Expenses: Sanitation                    | 88,783           | 106,062          | 129,188          | 136,940          | -----    | -----    | -----    |
| 3    | Professional service providers                  | -----            | -----            | -----            | -----            | -----    | -----    | -----    |
| 4    | Departmental Expenses: Bulk Treatment           | 340,372          | 447,580          | 531,702          | 563,604          | -----    | -----    | -----    |
|      | Departmental Expenses: Network Maintenance      | 454,812          | 765,278          | 601,126          | 637,194          | -----    | -----    | -----    |
|      | Departmental Expenses: Sanitation               | 114,670          | 379,244          | 408,323          | 432,822          | -----    | -----    | -----    |
| 5    | Repairs and Maintenance: Bulk Treatment         | 382,034          | 437,866          | 472,878          | 501,251          | -----    | -----    | -----    |
|      | Repairs and Maintenance: Network Maintenance    | 46,866           | 134,780          | 140,587          | 149,023          | -----    | -----    | -----    |
|      | Repairs and Maintenance: Sanitation             | 579              | 1,749            | 738              | 782              | -----    | -----    | -----    |
| 6    | Financing Costs: Bulk Treatment                 | -----            | 790,170          | -----            | -----            | -----    | -----    | -----    |
|      | Financing Costs: Network Maintenance            | -----            | 939,913          | -----            | -----            | -----    | -----    | -----    |
|      | Financing Costs: Sanitation                     | -----            | -----            | -----            | -----            | -----    | -----    | -----    |
| 7    | <b>Total Expences : Sanitation</b>              | <b>5,362,247</b> | <b>9,532,047</b> | <b>7,060,594</b> | <b>7,484,231</b> | <b>0</b> | <b>0</b> | <b>0</b> |

### F 9.2.1.3 Operating income: subsidies

|                                                                 | Current | Record: Prior |       |       |       |       |
|-----------------------------------------------------------------|---------|---------------|-------|-------|-------|-------|
|                                                                 |         | -Yr 1         | -Yr 2 | -Yr 3 | -Yr 4 | -Yr 5 |
| 1. Equitable share allocation                                   |         |               |       |       |       |       |
| 2. % Equitable Share allocated to basic water supply            |         |               |       |       |       |       |
| 3. % Equitable Share allocated to basic sanitation provided     |         |               |       |       |       |       |
| 4. % Of other subsidies allocated to basic water supply         |         |               |       |       |       |       |
| 5. % Of other subsidies allocated to basic sanitation provision |         |               |       |       |       |       |

**No Data Available**

## F 9.3 Tariffs and Charges

### F 9.3.1 Situation Assessment (Tariffs and Charges)

#### F 9.3.1.1 Fixed charges : residential (per month) for water

|                               | Current | Record: Prior |          |          |          |          |
|-------------------------------|---------|---------------|----------|----------|----------|----------|
|                               |         | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 1. Communal water supply      | 0       | 0             | 0        | 0        | 0        | 0        |
| 2. Controlled volume supply   | N/A     | N/A           | N/A      | N/A      | N/A      | N/A      |
| 3. Uncontrolled volume supply | 0       | 0             | 0        | 0        | 0        | 0        |

#### F 9.3.1.2 Fixed charges : residential (per month) for sanitation

|                                                                                   | Current | Record: Prior |          |          |          |          |
|-----------------------------------------------------------------------------------|---------|---------------|----------|----------|----------|----------|
|                                                                                   |         | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 1. Consumer installations: VIP or equivalent                                      | 0       | 0             | 0        | 0        | 0        | 0        |
| 2. Consumer installations: Wet (septic tanks)                                     | 21      | 21            | 21       | 21       | 21       | 21       |
| 3. Discharge to wastewater treatment works :<br>(intermediate or full waterborne) |         |               |          |          |          |          |
| Floor area of residence <70m <sup>2</sup>                                         | 48.10   |               |          |          |          |          |
| Floor area of residence 71 - 100m <sup>2</sup>                                    | 61.95   |               |          |          |          |          |
| Floor area of residence 101 - 200m <sup>2</sup>                                   | 94.90   |               |          |          |          |          |
| Floor area of residence >200m <sup>2</sup>                                        | 113.60  |               |          |          |          |          |

**No Data Available**

#### F 9.3.1.3 Volume charges or other charge mechanisms: residential sanitation

|                                                                                   | Current | Record: Prior |          |          |          |          |
|-----------------------------------------------------------------------------------|---------|---------------|----------|----------|----------|----------|
|                                                                                   |         | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 1. Consumer installations: VIP or equivalent                                      | 0       | 0             | 0        | 0        | 0        | 0        |
| 2. Consumer installations: Wet (septic tanks)                                     | N/A     | N/A           | N/A      | N/A      | N/A      | N/A      |
| 3. Discharge to wastewater treatment works :<br>(intermediate or full waterborne) | N/A     | N/A           | N/A      | N/A      | N/A      | N/A      |

#### F 9.3.1.4 Block tariffs : residential (cents/kl) for water

| Service Level              | Block                       | Block definition | Current | Record: Prior |          |          |          |          |
|----------------------------|-----------------------------|------------------|---------|---------------|----------|----------|----------|----------|
|                            |                             |                  |         | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| Communal Water Supply      | 1(a) Free Basic Water       | 0 - 10kl         | 0       | 0             | 0        | 0        | 0        | 0        |
|                            | 1(b) Not Free Basic Water * | 0 - 10kl         | 280     |               |          |          |          |          |
| Controlled Volume Supply   | 1(a) Free Basic Water       | 0 - 10kl         | 0       |               |          |          |          |          |
|                            | 1(b) Not Free Basic Water*  | 0 - 10kl         | 280     |               |          |          |          |          |
|                            | 2                           | 11 - 18kl        | 450     |               |          |          |          |          |
|                            | 3                           | 19 - 90kl        | 270     |               |          |          |          |          |
| Uncontrolled Volume Supply | 1(a) Free Basic Water       | 0 - 10kl         | 0       |               |          |          |          |          |
|                            | 1(b) Not Free Basic Water * | 0 - 6kl          | 280     |               |          |          |          |          |
|                            | 2                           | 7 - 18kl         | 450     |               |          |          |          |          |
|                            | 3                           | 19 - 90kl        | 270     |               |          |          |          |          |
|                            | 4                           | >91kl            | 345     |               |          |          |          |          |
|                            | 5                           |                  |         |               |          |          |          |          |

**No Data Available**

### F 9.4 Free basic water and Sanitation

## **F 9.4.1 Situation Assessment**

### **F 9.4.1.1 Subsidy target approach for free basic water**

| Subsidy targeting approach  | Percentage of households targeted |
|-----------------------------|-----------------------------------|
| 1. Rising block tariff      | 100%                              |
| 2. Service level targeting  | 100%                              |
| 3. Credits to water account | 100%                              |
| 4. Other                    | N/A                               |

### **F 9.4.1.2 Subsidy target approach for free basic sanitation**

| Subsidy targeting approach  | Percentage of households targeted |
|-----------------------------|-----------------------------------|
| 1. Rising block tariff      | 100%                              |
| 2. Service level targeting  | 100%                              |
| 3. Credits to water account | 100%                              |
| 4. Other                    | N/A                               |

## **F 9.5 Charges and Block tariffs**

### F 9.5.1 Situation Assessment

#### F 9.5.1.1 Fixed charges and block tariffs : industrial for water

|                                               | Block definition | Current | Record: Prior |          |          |          |          |
|-----------------------------------------------|------------------|---------|---------------|----------|----------|----------|----------|
|                                               |                  |         | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 1. Fixed monthly charge (0-50mm connection)   | 7 – 90kl         | 158.10  |               |          |          |          |          |
| 2. Fixed monthly charge (51-150mm connection) | 7 – 90kl         | 433.80  |               |          |          |          |          |
| 3. Volume charge                              |                  |         |               |          |          |          |          |
| a) Tariff 1                                   | 0-6kl            | 1.50    |               |          |          |          |          |
| b) Tariff 2                                   | 7-90kl           | 2.55    |               |          |          |          |          |
| c) Tariff 3                                   | >90kl            | 2.70    |               |          |          |          |          |

#### F 9.5.1.2 Fixed charges and block tariffs : industrial for wastewater

|                         | Block definition                                                                                     | Current                    | Record: Prior |          |          |          |          |
|-------------------------|------------------------------------------------------------------------------------------------------|----------------------------|---------------|----------|----------|----------|----------|
|                         |                                                                                                      |                            | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 1. Fixed monthly charge | 0 – 200m <sup>2</sup><br>200 – 500m <sup>2</sup><br>For every 400 m <sup>2</sup> > 500m <sup>2</sup> | 105.95<br>211.90<br>317.85 |               |          |          |          |          |
| 2. Volume charge        | N/A                                                                                                  |                            |               |          |          |          |          |
| (a)                     |                                                                                                      |                            |               |          |          |          |          |
| (b)                     |                                                                                                      |                            |               |          |          |          |          |

#### F 9.5.1.3 Fixed charges and block tariffs : commercial for water

|                                               | Block definition | Current | Record: Prior |          |          |          |          |
|-----------------------------------------------|------------------|---------|---------------|----------|----------|----------|----------|
|                                               |                  |         | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 4. Fixed monthly charge (0-50mm connection)   | 7 – 90kl         | 158.10  |               |          |          |          |          |
| 5. Fixed monthly charge (51-150mm connection) | 7 – 90kl         | 433.80  |               |          |          |          |          |
| 6. Volume charge                              |                  |         |               |          |          |          |          |
| (c) Tariff 1                                  | 0-6kl            | 1.50    |               |          |          |          |          |
| (d) Tariff 2                                  | 7-90kl           | 2.55    |               |          |          |          |          |
| (e) Tariff 3                                  | >90kl            | 2.70    |               |          |          |          |          |

#### F 9.5.1.4 Fixed charges and block tariffs : commercial for wastewater

|                         | Block definition                                                                                     | Current                    | Record: Prior |          |          |          |          |
|-------------------------|------------------------------------------------------------------------------------------------------|----------------------------|---------------|----------|----------|----------|----------|
|                         |                                                                                                      |                            | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 3. Fixed monthly charge | 0 – 200m <sup>2</sup><br>200 – 500m <sup>2</sup><br>For every 400 m <sup>2</sup> > 500m <sup>2</sup> | 105.95<br>211.90<br>317.85 |               |          |          |          |          |
| 4. Volume charge        | N/A                                                                                                  |                            |               |          |          |          |          |
| (f)                     |                                                                                                      |                            |               |          |          |          |          |
| (g)                     |                                                                                                      |                            |               |          |          |          |          |

#### F 9.5.1.5 Fixed charges and block tariffs : other for water

|                                                                           | Block definition    | Current                 | Record: Prior |          |          |          |          |
|---------------------------------------------------------------------------|---------------------|-------------------------|---------------|----------|----------|----------|----------|
|                                                                           |                     |                         | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 7. Fixed monthly charge<br>2 room house<br>3 room house<br>4/5 room house | Flat Rate per month | 63.00<br>72.30<br>90.55 |               |          |          |          |          |
| 8. Volume charge                                                          | Tanker loads/kl     | 2.55                    |               |          |          |          |          |

## F 9.6 Income and Sales

## F 9.6.1 Situation Assessment

### F 9.6.1.1 Total income (and non-payment) and expenditure: water

|                                               | Current | Record: Prior |          |          |          |          |
|-----------------------------------------------|---------|---------------|----------|----------|----------|----------|
|                                               |         | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 1. Total income (billed income and subsidies) |         |               |          |          |          |          |
| 2. Actual income received                     |         |               |          |          |          |          |
| 3. % Non-payment                              |         |               |          |          |          |          |
| 4. Non-payment by residential consumers       |         |               |          |          |          |          |
| 5. Non-payment by commercial consumers        |         |               |          |          |          |          |
| 6. Non-payment by industrial consumers        |         |               |          |          |          |          |
| 7. Non-payment by other consumers             |         |               |          |          |          |          |
| 8. Total non-payment (4+5+6+7)                |         |               |          |          |          |          |
| 9. Operating expenditure                      |         |               |          |          |          |          |
| 10. Capital expenditure                       |         |               |          |          |          |          |
| 11. Total expenditure (9+10)                  |         |               |          |          |          |          |
| 12. Equitable share allocated to water supply |         |               |          |          |          |          |
| 13. Surplus (deficit) (2 minus 11)            |         |               |          |          |          |          |

**No Data Available**

### F 9.6.1.2 Total income (and non-payment) and expenditure: sanitation

|                                                    | Current | Record: Prior |          |          |          |          |
|----------------------------------------------------|---------|---------------|----------|----------|----------|----------|
|                                                    |         | -Yr<br>1      | -Yr<br>2 | -Yr<br>3 | -Yr<br>4 | -Yr<br>5 |
| 1. Total income (billed income and subsidies)      |         |               |          |          |          |          |
| 2. Actual income                                   |         |               |          |          |          |          |
| 3. % Non-payment                                   |         |               |          |          |          |          |
| 4. Non-payment by residential consumer             |         |               |          |          |          |          |
| 5. Non-payment by commercial consumers             |         |               |          |          |          |          |
| 6. Non-payment by industrial consumers             |         |               |          |          |          |          |
| 7. Non-payment by other consumers                  |         |               |          |          |          |          |
| 8. Total non-payment (4+5+6+7)                     |         |               |          |          |          |          |
| 9. Operating expenditure                           |         |               |          |          |          |          |
| 10. Capital expenditure                            |         |               |          |          |          |          |
| 11. Total expenditure (9+10)                       |         |               |          |          |          |          |
| 12. Equitable share allocated to sanitation supply |         |               |          |          |          |          |
| 13. Surplus (deficit) (2 minus 11)                 |         |               |          |          |          |          |

### F 9.6.1.3 Sales Arrangements

**No Data Available**

- Type of Billing system
- Method of sending bills
- Arrangements for payment collection
- Credit control arrangements

## F 9.7 Metering and Billing

## F 9.7.1 Situation Assessment (metering and billing)

### F 9.7.1.1 Metering and Billing : Urban

|                                           | Prior 1  | Current  | Year 1   | Year 2   | Year 3   | Year 4   | Year 5   |
|-------------------------------------------|----------|----------|----------|----------|----------|----------|----------|
| <b>Communal supply</b>                    |          |          |          |          |          |          |          |
| 1. % communal standpipes metered          | 0        | 0        | 25%      | 50%      | 75%      | 100%     | 100%     |
| 2. % communal standpipes metered(prepaid) |          |          |          |          |          |          |          |
| <b>Controlled volume supply</b>           |          |          |          |          |          |          |          |
| 3. % consumers billed monthly             | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| <b>Uncontrolled volume supply</b>         |          |          |          |          |          |          |          |
| 4. % consumers billed monthly             | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 5. % consumers meters read monthly        | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 6. % consumers consumption estimated      | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  |
| <b>Paypoints</b>                          | <b>5</b> | <b>5</b> | <b>5</b> | <b>5</b> | <b>6</b> | <b>6</b> | <b>7</b> |
| 7. No. billed consumer units/paypoint     | 2511     | 2796     | 2852     | 2909     | 2473     | 2522     | 2573     |
| 8. No. prepaid consumer units/outlet      | 0        | 0        | 0        | 200      | 400      | 600      | 1000     |
| <b>General</b>                            |          |          |          |          |          |          |          |
| 9. Number of new meters installations     | 30       | 105      | 107      | 109      | 111      | 113      | 116      |
| 10. % meters tested                       | 0.8%     | 1%       | 1.5%     | 2%       | 2.5%     | 3%       | 3.5%     |
| 11. % meters replaced                     | 1%       | 1.2%     | 1.2%     | 1.3%     | 1.3%     | 1.4%     | 1.4%     |

### F 9.7.1.2 Metering and Billing : Rural dense

|                                           | Prior 1  | Current  | Year 1   | Year 2   | Year 3   | Year 4   | Year 5   |
|-------------------------------------------|----------|----------|----------|----------|----------|----------|----------|
| <b>Communal supply</b>                    |          |          |          |          |          |          |          |
| 1. % communal standpipes metered          | 0        | 0        | 25%      | 50%      | 75%      | 100%     | 100%     |
| 2. % communal standpipes metered(prepaid) |          |          |          |          |          |          |          |
| <b>Controlled volume supply</b>           |          |          |          |          |          |          |          |
| 3. % consumers billed monthly             | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| <b>Uncontrolled volume supply</b>         |          |          |          |          |          |          |          |
| 4. % consumers billed monthly             | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 5. % consumers meters read monthly        | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 6. % consumers consumption estimated      | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  |
| <b>Paypoints</b>                          | <b>5</b> | <b>5</b> | <b>5</b> | <b>5</b> | <b>6</b> | <b>6</b> | <b>7</b> |
| 7. No. billed consumer units/paypoint     | 2511     | 2796     | 2852     | 2909     | 2473     | 2522     | 2573     |
| 8. No. prepaid consumer units/outlet      | 0        | 0        | 0        | 200      | 400      | 600      | 1000     |
| <b>General</b>                            |          |          |          |          |          |          |          |
| 9. Number of new meters installations     | 30       | 105      | 107      | 109      | 111      | 113      | 116      |
| 10. % meters tested                       | 0.8%     | 1%       | 1.5%     | 2%       | 2.5%     | 3%       | 3.5%     |
| 11. % meters replaced                     | 1%       | 1.2%     | 1.2%     | 1.3%     | 1.3%     | 1.4%     | 1.4%     |

### F 9.7.1.3 Metering and Billing : Rural villages

|                                           | Prior 1  | Current  | Year 1   | Year 2   | Year 3   | Year 4   | Year 5   |
|-------------------------------------------|----------|----------|----------|----------|----------|----------|----------|
| <b>Communal supply</b>                    |          |          |          |          |          |          |          |
| 1. % communal standpipes metered          | 0        | 0        | 25%      | 50%      | 75%      | 100%     | 100%     |
| 2. % communal standpipes metered(prepaid) |          |          |          |          |          |          |          |
| <b>Controlled volume supply</b>           |          |          |          |          |          |          |          |
| 3. % consumers billed monthly             | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| <b>Uncontrolled volume supply</b>         |          |          |          |          |          |          |          |
| 4. % consumers billed monthly             | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 5. % consumers meters read monthly        | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 6. % consumers consumption estimated      | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  |
| <b>Paypoints</b>                          | <b>5</b> | <b>5</b> | <b>5</b> | <b>5</b> | <b>6</b> | <b>6</b> | <b>7</b> |
| 7. No. billed consumer units/paypoint     | 2511     | 2796     | 2852     | 2909     | 2473     | 2522     | 2573     |
| 8. No. prepaid consumer units/outlet      | 0        | 0        | 0        | 200      | 400      | 600      | 1000     |
| <b>General</b>                            |          |          |          |          |          |          |          |
| 9. Number of new meters installations     | 30       | 105      | 107      | 109      | 111      | 113      | 116      |
| 10. % meters tested                       | 0.8%     | 1%       | 1.5%     | 2%       | 2.5%     | 3%       | 3.5%     |
| 11. % meters replaced                     | 1%       | 1.2%     | 1.2%     | 1.3%     | 1.3%     | 1.4%     | 1.4%     |

#### F 9.7.1.4 Metering and Billing : Rural scattered

|                                           | Prior 1  | Current  | Year 1   | Year 2   | Year 3   | Year 4   | Year 5   |
|-------------------------------------------|----------|----------|----------|----------|----------|----------|----------|
| <b>Communal supply</b>                    |          |          |          |          |          |          |          |
| 1. % communal standpipes metered          | 0        | 0        | 25%      | 50%      | 75%      | 100%     | 100%     |
| 2. % communal standpipes metered(prepaid) |          |          |          |          |          |          |          |
| <b>Controlled volume supply</b>           |          |          |          |          |          |          |          |
| 3. % consumers billed monthly             | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| <b>Uncontrolled volume supply</b>         |          |          |          |          |          |          |          |
| 4. % consumers billed monthly             | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 5. % consumers meters read monthly        | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 6. % consumers consumption estimated      | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  |
| <b>Paypoints</b>                          | <b>5</b> | <b>5</b> | <b>5</b> | <b>5</b> | <b>6</b> | <b>6</b> | <b>7</b> |
| 7. No. billed consumer units/paypoint     | 2511     | 2796     | 2852     | 2909     | 2473     | 2522     | 2573     |
| 8. No. prepaid consumer units/outlet      | 0        | 0        | 0        | 200      | 400      | 600      | 1000     |
| <b>General</b>                            |          |          |          |          |          |          |          |
| 9. Number of new meters installations     | 30       | 105      | 107      | 109      | 111      | 113      | 116      |
| 10. % meters tested                       | 0.8%     | 1%       | 1.5%     | 2%       | 2.5%     | 3%       | 3.5%     |
| 11. % meters replaced                     | 1%       | 1.2%     | 1.2%     | 1.3%     | 1.3%     | 1.4%     | 1.4%     |

#### F 9.7.1.5 Metering and Billing : Rural farmland

|                                            | Prior 1  | Current  | Year 1   | Year 2   | Year 3   | Year 4   | Year 5   |
|--------------------------------------------|----------|----------|----------|----------|----------|----------|----------|
| <b>Communal supply</b>                     |          |          |          |          |          |          |          |
| 1. % communal standpipes metered           | 0        | 0        | 25%      | 50%      | 75%      | 100%     | 100%     |
| 2. % communal standpipes metered (prepaid) |          |          |          |          |          |          |          |
| <b>Controlled volume supply</b>            |          |          |          |          |          |          |          |
| 3. % consumers billed monthly              | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| <b>Uncontrolled volume supply</b>          |          |          |          |          |          |          |          |
| 4. % consumers billed monthly              | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 5. % consumers meters read monthly         | 89%      | 89%      | 91%      | 93%      | 95%      | 97%      | 100%     |
| 6. % consumers consumption estimated       | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  | Unknown  |
| <b>Paypoints</b>                           | <b>5</b> | <b>5</b> | <b>5</b> | <b>5</b> | <b>6</b> | <b>6</b> | <b>7</b> |
| 7. No. billed consumer units/paypoint      | 2511     | 2796     | 2852     | 2909     | 2473     | 2522     | 2573     |
| 8. No. prepaid consumer units/outlet       | 0        | 0        | 0        | 200      | 400      | 600      | 1000     |
| <b>General</b>                             |          |          |          |          |          |          |          |
| 9. Number of new meters installations      | 30       | 105      | 107      | 109      | 111      | 113      | 116      |
| 10. % meters tested                        | 0.8%     | 1%       | 1.5%     | 2%       | 2.5%     | 3%       | 3.5%     |
| 11. % meters replaced                      | 1%       | 1.2%     | 1.2%     | 1.3%     | 1.3%     | 1.4%     | 1.4%     |

## F.10 List of Projects for Water and Sanitation

| Strategies |                                           | Projects |                                                                                                                                    | Timeframe                | Responsible Department | Status     | Costs              | Financial Source       | Comments                                                                          |
|------------|-------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------|------------|--------------------|------------------------|-----------------------------------------------------------------------------------|
| No.        | Name                                      | Nr.      | Name                                                                                                                               |                          |                        |            |                    |                        |                                                                                   |
| 1.1        | Improvement & upgrading of water networks | 1.1.1    | Implementation of water services system investigation Phase 1                                                                      | 2004/2005                | Dir. Tech. Serv        | In process | R1,150m            | Council                | In process                                                                        |
| 1.1        |                                           | 1.1.2    | Installation of individual water meters on sites, currently sharing meters                                                         | Annually/ Identification | Dir. Tech. Serv        | In process | Variable           | Council                | In process                                                                        |
| 1.1        |                                           | 1.1.3    | Repairing of leaks (indigenous households)                                                                                         | In process               | Dir. Tech. Serv        | In process | R60 000            | Council                | Once-off projects for repairs/training regarding water leakage at indigent users. |
| 1.1        |                                           | 1.1.4    | Phasing in of pre-paid water meters                                                                                                | 2002 - 2007              | Dir. Tech. Serv        | Continuous | ±R450 000 p/a      | Council                | In process                                                                        |
| 1.1        |                                           | 1.1.5    | Replacement of worn-out water pipelines, where repeated breaks appear.                                                             | Annually/ Identification | Dir. Tech. Serv        | Continuous | R300 000           | Council                | Feasible                                                                          |
| 1.2        | Extension of water networks               | 1.2.1    | Raw water provision to schools currently without                                                                                   | In process               | Dir. Tech. Serv        | In process | R180 000           | Council                | Funding for appointment of consultant for investigation                           |
| 1.2        |                                           | 1.2.2    | Provision of water on already occupied residential sites within Council's area of jurisdiction                                     | 2005/2006                | Dir. Tech. Serv        | 83         | R 300 000 p/a      | Council                | Type of water meters must be finalised (Request 'SAD' even Louisvale road)        |
| 1.2        |                                           | 1.2.3    | Provision of clean drinking water in Uitkoms East Ward 12 (rising main, treatment plant & standpipes)                              | 2006/2007                | Dir. Tech. Serv        | 79         | R 585 000          | Council                | First step = procuring of the land, town planning & surveying                     |
| 1.2        |                                           | 1.2.4    | Installation of standpipes at organised informal housing, i.e. Swartkops/Donkerhoek, Louisvale, Kalksloot, Nkululeko & Dawidskampi | Annually/ Identification | Dir. Tech. Serv        | Completed  | R150 000- R240 000 | Council / District Mun | Completed                                                                         |
| 1.2        |                                           | 1.2.5    | Water infrastructure for subsidy sites                                                                                             | Annually/ Identification | Dir. Tech. Serv        | Continuous | Variable           | Council                | Feasible                                                                          |
| 1.2        |                                           | 1.2.6    | Installation of water infrastructure for new town extensions i.e. Olyvenhoutsdrift (ward 5)                                        | Annually/ Identification | Dir. Tech. Serv        | Continuous | Variable           | Council                | Feasible                                                                          |
| 1.2        |                                           |          |                                                                                                                                    |                          |                        |            |                    |                        |                                                                                   |

|     |                                                        |       |                                                                                                    |                                        |                 |            |                             |                     |                                                         |
|-----|--------------------------------------------------------|-------|----------------------------------------------------------------------------------------------------|----------------------------------------|-----------------|------------|-----------------------------|---------------------|---------------------------------------------------------|
| 1.3 | Planning and management of water networks              | 1.3.1 | Execution of water services system investigation & elimination of bottle-necks                     | In process                             | Dir. Tech. Serv | Continuous | ±R240 000 p/a               | Council             | In process                                              |
| 1.3 |                                                        | 1.3.2 | Installation of network reinforcements according to the computerized WADISO water network program. | Annually according to WADISO programme | Dir. Tech. Serv | Continuous | R200 000 p/a.               | Council             | Feasible                                                |
| 1.3 |                                                        | 1.3.3 | Compliance to amended water legislation                                                            | Annually/ Identification               | Dir. Tech. Serv | Continuous | Fluoridation ±R500 000 once | Council             | Applications done for initial release of requirements   |
| 1.3 |                                                        | 1.3.4 | Protection / safe guarding of structures (reservoirs, pump stations).                              | 2002/2003                              | Dir. Tech. Serv | Continuous | R100 000                    | Council             | Continuous                                              |
| 1.4 | Maintenance and upgrading of bulk water installations  | 1.4.1 | Raw water storage at Lambrechtsdrif, Leerkranz, Louisvale Karos                                    | 2004/2005                              | Dir. Tech. Serv | In process | R1,8mil                     | CMIP                | In Process 2004/5                                       |
| 1.4 |                                                        | 1.4.2 | Water purification works at Struassburg                                                            | 2004/2005                              | Dir. Tech. Serv | In process | R980 000                    | CMIP                | In Process 2004/5                                       |
| 1.4 |                                                        | 1.4.3 | Filters Water works                                                                                | 2004/2005                              | Dir. Tech. Serv | In process | 3 x R800 000 = R2 400 000   | Council             | In Process 2004/5                                       |
| 1.4 |                                                        | 1.4.4 | Water purification works for Swartkop/Donkerhoek, Louisvale & Lambrechtsdrif.                      | 2003/2004                              | Dir. Tech. Serv | Completed  | ±R200 000 /Installation     | Council / DWAF CMIP | Completed                                               |
| 1.4 |                                                        | 1.4.5 | Replacement of Keidebees floating membrane roof                                                    | 2003/2004                              | Dir. Tech. Serv | In process | R740 000                    | Council             | Rest of funds must be provided in 2004/2005             |
| 1.4 |                                                        | 1.4.6 | Replacement of worn-out pump equipment & switch at gear purification works and pump stations       | Continuous                             | Dir. Tech. Serv | Continuous | R500 000                    | Council             | Continuous                                              |
| 1.4 |                                                        | 1.4.7 | Install 2x sediment tanks A. Holbors September Water works                                         | 2005/2006                              | Dir. Tech. Serv | 80         | R4,1mil                     | Council / CMIP      | Need additional capacity                                |
|     |                                                        |       |                                                                                                    |                                        |                 |            |                             |                     |                                                         |
| 2.1 | Upgrading and maintenance of existing sewerage network | 2.1.1 | Installation of sewerage system at Budler street                                                   | 2004/2005                              | Dir. Tech. Serv | In process | R345 000                    | Council             | Seeping sewerage adjacent to the river - pollution risk |
| 2.1 |                                                        | 2.1.2 | Upgrading / repairing of the old sewerage line in Murray/n, from Nr. 1 to pump house.              | 2004/2005                              | Dir. Tech. Serv | In process | R180 000                    | Council             | In process 2004/2005                                    |
| 2.1 |                                                        | 2.1.3 | Opening and other maintenance on sewerage line - Rosedale                                          | Continuous                             | Dir. Tech. Serv | In process | Operational budget          | Council             | Continuous                                              |

|     |                                                           |       |                                                                                              |                                      |                         |            |               |                     |                                                                                     |
|-----|-----------------------------------------------------------|-------|----------------------------------------------------------------------------------------------|--------------------------------------|-------------------------|------------|---------------|---------------------|-------------------------------------------------------------------------------------|
| 2.2 | Extension and supply of new sewerage network              | 2.2.1 | Installation of sewerage infrastructure for new town extensions.                             | Annually/ Identification             | Dir. Tech. Serv         | Continuous | Variable      | Council             | Continuous                                                                          |
| 2.3 | Maintenance and upgrading of bulk sewerage infrastructure | 2.3.1 | Sewerage connection line for housing subsidy project                                         | Annually/ Identification             | Dir. Tech. Serv         | Continuous | ±R250 000 p/a | Council             | Feasible                                                                            |
| 2.3 |                                                           | 2.3.2 | Extension of Louisvale Road-sewerage works                                                   | 2005/2006                            | Dir. Tech. Serv         | 74         | ±R1 035 000   | Council / DWAF CMIP | Wait for funding                                                                    |
| 2.3 |                                                           | 2.3.3 | Upgrading of Nr 2 consume tank at purification works                                         | 2003/2005                            | Dir. Tech. Serv         | Completed  | R330 000      | Council             | Completed                                                                           |
| 2.3 |                                                           | 2.3.4 | Enlargement of main sewerage drainage line currently experiencing capacity problems          | Annually/ Identification             | Dir. Tech. Serv         | Continuous | ±R400 000 p/a | Council             | Continuous                                                                          |
| 2.3 |                                                           | 2.3.5 | Upgrading of sewerage pump stations, switch gear & telemetry control                         | Annually                             | Dir. Tech. Serv         | Continuous | R140 000      | Council             | Continuous                                                                          |
| 2.3 |                                                           | 2.3.6 | Replacement of worn-out pumps, valves & equipment at purification works.                     | Continuous                           | Dir. Tech. Serv         | Continuous | ±R80 000 p/a  | Council             | Feasible                                                                            |
| 2.3 |                                                           | 2.3.7 | Extension of sewerage networks according to the computerised SEWSAN sewerage network program | Annually according to SEWSAN program | Dir. Tech. Serv         | Continuous | R250 000      | Council             | Feasible                                                                            |
| 2.4 |                                                           | 2.4.1 | Erection of VIP toilets in new incorporated residential areas                                | 2004/2005                            | Dir. Tech. Serv         | In process | R2730/toilet  | CMIP / Mvula Trust  | need identified = 831 toilets. Council provide counter funding to Mvula Trust funds |
| 2.4 |                                                           | 2.4.2 | Erection of toilet structures in organised informal settlements                              | 2004/2005                            | Dir. Tech. Serv         | In process | R2730/toilet  | Council             | 3 organised informal settlements - 1400 stands                                      |
| 2.4 |                                                           | 2.4.3 | Sewerage infrastructure & toilet structures for sites at Echo street, Paballelo              | 2004/2005                            | Dir. Tech. Serv         | In process | R190 000      | Council             | ±10 even without sewerage                                                           |
| 2.4 | Improvement and upgrading of sanitation facilities        | 2.4.4 | Toilets closer to old asbestos roof & other houses. Morning Glory - Ward 2                   | 2005/2006                            | Dir. Dev Serv (housing) | In process | Unknown       | Council             | Feasible                                                                            |
| 2.4 |                                                           | 2.4.5 | Out-phasing of the bucket system in the formal residential areas.                            | 2004/2005                            | Dir. Tech. Serv         | In process | R3,7mil       | RDP Funds           | All previous projects completed with CMIP funds.                                    |
| 2.4 |                                                           | 2.4.6 | Moving of existing toilets nearer to old houses in Louisvale Road + Morning Glory            | Dependent on external funding        | Dir. Tech. Serv         | 76         | R1,68mil      | CMIP                | Feasible                                                                            |

